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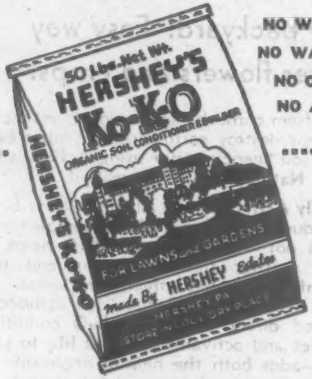

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EARTHWORMS PINCH HIT FOR HER INVALID HUSBAND

May 16, 1947.

Some months ago we subscribed for your magazine, but before we received any copies I was counting on building a compost pile and really doing big things for my garden. But after the material came I read, and sighed, and gave up. But that is not the end of the story.

We live on a little place of about three acres in the country, with a very large garden and young fruit trees. My husband is an invalid so I have the work inside and outside to do all alone. The physical labor of a compost pile would be beyond my time or strength. I felt greatly disappointed, but was none the less interested.

I had practiced mulching for some time with the idea of keeping down weeds and conserving moisture. The resulting enrichment of the soil had not entered my head. We once had a patch of red raspberries that I had kept rather heavily mulched and it bore magnificiently but I did not give the credit to any enrichment of the soil at the time. When we came here two years ago we found the place high with weeds, as it had lain idle for some years. In the fight against the weeds I cut weeds before they seeded and threw them into a great pile or used them to mulch the berries and trees. I would pull young weeds and pile them high about my plants and soon they would all be gone. I was puzzled about it and a little disturbed, but since I felt that a thick covering was necessary to conserve the moisture to work and pile on more weeds.

This spring when I set out to look about my things my mulch had dis-

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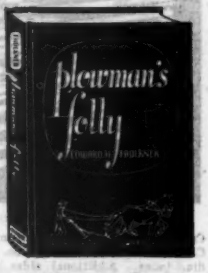
E. H. Faulkner



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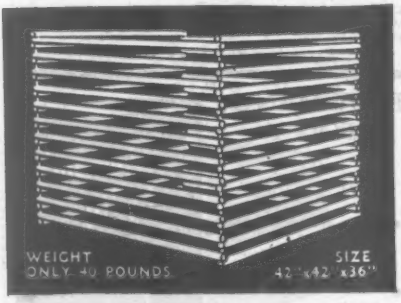

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appeared entirely. A great pile of waste vegetation from a grocery store which I had piled on the garden was completely gone. As I read your magazine I began to understand what had been happening. And I am reaping benefits from my haphazard work of last year even though it is not so effective as real compost would be. The earthworms are my helpers in that they are converting the plant materials into compost for me.

Near the house the soil is very poor, hard clay. Last year I kept fighting weeds and pulling them up and piling them along the foundation. This spring I had occasion to dig a little there and found the first inch or two of soil black and mellow. Underneath it was still hard clay. The same situation has resulted wherever I throw the weeds and old grass. And such a crop of earthworms! It would do your heart good.

In an attempt to clean up a wood pile which had lain for several years I found quantities of decayed wood. This I have been gathering up and scattering over my previous beds of asparagus, strawberries, and such, and mixing it with the soil when I plant trees and shrubs.

So do not despair if you are unable to build a regulation compost pile. The benefits from any organic matter added to the soil are worthwhile and will bear fruit sooner than one would think. You who can make compost are fortunate. I am thankful to the earthworms who help convert my plant materials into compost.

Mrs. Harry S. Laurence,
Box 343,
Columbia City, Indiana.

—o—

BIRDS EAT CABBAGE WORMS

May 26, 1947.

I thought you might be interested in a little experiment I made last year and the results obtained. I set out two 60-foot rows of cabbage plants and decided not to use any chemical fertil-

"An even better book, by and large, than PLOWMAN'S FOLLY."
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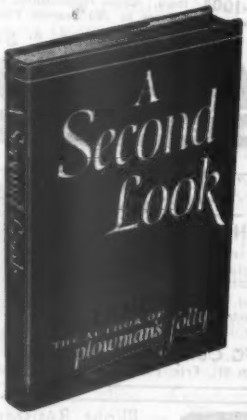
A SECOND LOOK

The scientific rules for natural enrichment of impoverished soil

EDWARD H. FAULKNER, who astonished the agricultural world with his revolutionary theories of plowless farming in PLOWMAN'S FOLLY, adds to and re-examines his earlier conclusions in this new book. After extensive experiments of his own, and visits to experiment stations, soil scientists, and farmers in 24 states, he can authoritatively give the lie to the theory of "soil impoverishment" which has led to the indiscriminate use of commercial fertilizer. Faulkner shows that the development of "real soil", through the decay of organic matter that unlocks the minerals required for healthy plant growth, in the long run not only increases productivity and quality, but makes plants so healthy that the need for sprays and insecticides is greatly diminished, if not done away with entirely.



Faulkner not only discusses his theory at length but gives actual case histories of its application which anyone can apply to his own soil problems.

He tells how Southern farmers, using green manure on a sandy soil, produce 50 to 100 bushels of corn where 10 grew before. He describes his own experience in bringing back a patchy lawn to a verdant green. He writes of a victory gardener in Ohio, who, using Faulkner's methods of plowless farming, green manure, and level cultivation throughout the year, greatly improved his entire garden's yield. These are just a few of the hundreds of cases from every part of the country of increased productivity due to "natural" soil enrichment. They all go to prove that Faulkner's methods basically are applicable to any soil problem in any soil area.

Experts praise this book highly

LOUIS BROMFIELD says of this book: "It is a rich book, stimulating and significant of the new, lively and practical interest in agriculture which is growing among industrialists, bankers and laymen of all sorts. It asks for the answer and explanation of many facts known as such by experienced farmers which research has until now failed to provide . . . the book is dedicated to the promise that if sufficient organic material were restored to most American agricultural soil, the need for commercial or "artificial" fertilizers would be nullified."

RUSSELL LORD says: "He remains, happily, the Number One Needler of a hide-bound, orthodox agriculture in this land."

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izers or spray materials. I was rather disgusted when I found the little green worms were starting to appear, however I decided to wait and see what happened. After the worms reached between 1/4 and 3/8 inches in size, a pair of wrens and a pair of bluebirds moved in and cleaned out practically every worm and I did not lose a single plant. My neighbor used spray material and the birds seemed to ignore his plants.

C. M. Snell,
R. F. D. # 2,
Nash Road,
North Tonawanda, N. Y.

—o—

ORGANIC GARDENING IS UNUSUAL AND INFORMATIVE

May 28, 1947

Organic Gardening Magazine is as different from other garden magazines as day is from night. It is definitely unusual, heplful, and informative. I have learned a lot from its pages in a short time. We had received three copies of Organic Gardening when I asked my husband if he intended to subscribe for it again. (You know, there are a thousand and one places for these small three-dollar lump sums and often some figuring needs to be done to make ends meet.) But what do you suppose my husband's answer was? He said, "why *sure*, we want it. I just wish we'd known about it before we bought that doggone national weekly." In so short a time, some one thinks it (O. G.) is of great importance.

Mrs. Robert McMartin,
Wrenwood Acres,
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Duluth (4), Minn.

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VITAMIN ENRICHED ONIONS

May 23, 1947

Let the dry onion sprout until the green sprout is about one-fourth inch long. Then cut into the onion from four sides to within one-half inch of the center. Peel away the mother onion until you have but the heart of the bulb with the sprout left. Eat these globulae or onion hearts raw without cutting them up, or use them in salads or sandwiches. They contain all the minerals and vitamins that nature stored in the body of the onion plus the life-giving chlorophyll. Use the rest of the onion bulb for boiling, baking, or frying for flavoring purposes, as flavoring is about all the body of the onion has left.

C. J. Arch,
Address unknown.

COMPOST PIT

April 15, 1947

In regard to your editorial "The Principle of Emminent Domain", it seems to me that if you use the compost pit that you will get away from a lot of objections regarding the making of compost. Your description of the pits in an earlier issue would seem to us to be the answer to anyone's objections. They not only look better but few people would ever mind having a pit as a "neighbor". The compost heap draws more attention than would the pits and the ignorant would probably never know that the pit existed and if they did—the fact that it is encased with concrete and covered with soil would erase all their objections.

H. H. Marsolf,
R. 2,
Hunter, Okla.

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The Rodale Diet

PART II

IN the last issue of this magazine I began a preliminary discussion of the Rodale Diet, which is an attempt to find foods that are more or less available to the general public, and which are normally grown without the aid of the strong chemical fertilizers. I listed salt water fish, kelp, mushrooms, cocoanuts, water-cress, indian nuts (of the pinyon pine), lichee nuts, mulberries, huckleberries, sometimes raspberries and blackberries, palm cabbage in Florida, wild rice and wild game. It is important that persistent efforts be maintained to educate the farmer to the idea that eventually he will have to discontinue the use of artifical fertilizers, that before long a considerable segment of the public will obtain their food from farmers who are pursuing organicultural practices, that he will be unable to obtain a fair price for his crops unless he grows them in a soil rich in humus.

This revolution will take time. In the meanwhile, I offer the Rodale Diet, only as a stop-gap. It is not the intension that people be asked to eat only foods that are listed in this diet, but if they will see to it that at least twenty or thirty percent of their total food intake comprises these foods, they will find that there will be a betterment in their health. In the Organic Trading Post Department of Organic Gardening Magazine there will be found advertisers who have for sale some foods organically grown. In time there will be more. If another ten or twenty percent of the diet will consist of such foods there will be available a total of thirty to possibly fifty percent of foods organically grown. This can give disease a smart punch in the solar-plexus. Let us continue with our discussion of the RODALE DIET:

CRANBERRIES—This berry is native to bogs and other similar habitats throughout the cooler parts of the temperate region. Native species occur from New England, south to New Jersey and west to Wisconsin. Originally cranberries were picked from wild plants and many still are harvested from plants growing in the wild state. In the last fifty years, however, they have been cultivated satisfactorily in Massachusetts, New Jersey, Wisconsin and Washington. Natural bog lands are used and the only treatment I know of is flooding every winter and treatment with an additional sand covering every season. Cranberries have good quantities of vitamin B and small amounts of the C vitamin. They have been used as natural remedies for gout and sometimes for diabetes. They are an astringent, that is, good for diarrhea.

MAPLE SYRUP—We are all familiar with the way the maple syrup is tapped from the tree, and as far as is known, no chemical fertilizers are used. Maple syrup in moderation is a desirable food containing minerals and vitamin B. It can be used as a substitute for white sugar, an unusually small quantity being sufficient to sweeten a cup of coffee. White sugar comes either from sugar cane or beets, both of which are grown with chemical fertilizers and refined until there is nothing of nutritional quality left. Besides there remains a trace of sulphur from the bleaching chemicals, and we should always be suspicious of added sulphurs. I strongly recommend that white sugar be dispensed with entirely and that maple syrup be substituted. It may be obtained in the average grocery store.

HONEY—Be sure it is natural honey. There are artificial products made from starches and acid salts of grape sugar, tinctured with honey perfume. It contains no mineral elements, vitamins or enzymes. The natural honey is full of living hormone-like qualities which makes it a valuable adjunct to the diet.

NUTS—Nut trees, having been neglected so much and having grown in natural habitats so long that they have developed disease resistance and strength unknown to the modern nursery fruit tree. They grow to a great extent in fertile fence rows which have an accumulated humus of centuries. They include walnuts, brazil nuts, hickory nuts, filberts, and pecans.

PECAN—In a letter from the Agricultural Experiment Station at College Station, Texas appears the following, "The pecan grows native in Texas. The annual crop ranges from twenty to sixty million pounds. Some of these pecans are grown on trees which are given orchard care but many are grown on trees which are given no care. The trees are neither fertilized nor sprayed. The only effort expended is that involved in harvesting the nuts."

This is confirmed by a letter received from the Agricultural Experiment Station at Stillwater, Oklahoma, which states: "We can very definitely list the pecan as one which is extensively grown without any kind of treatment. The pecan grows wild, and is produced in large quantities in this State and marketed; the trees having grown in a natural condition without any kind of treatment whatsoever. There are, however, some pecan groves in the State which are cultivated and sprayed and fertilized."

Nuts contain small quantities of vitamin B with traces of vitamin A.

Nuts are rich in protein, fat and carbohydrates and should be eaten in moderation and well-masticated. Nuts are a seed from which trees can grow and thus contain living elements which nature endows them with to assure the perpetuation of the species. Seed foods are valuable in the diet.

There will be a further discussion of the RODALE DIET in the next issue. By that time it is hoped there will be some correspondence from readers who possess information regarding other foods that may fit into this diet as well as other interesting letters. We are glad to say that among the 65,000 readers of Organic Gardening there are many farming and horticultural experts who possess much technical ability in these fields and who are extremely cooperative and helpful. It is in a worthy cause. Let us hear from anyone who has anything at all to say, either pro or con.

Here is a suggestion. Readers in smaller communities might, by questioning storekeepers, track down certain items of food, to the farm on which they have grown. This might be made into an interesting game by persons who are looking for automobile trips that have a goal or a destination. Suppose storekeeper Smith tells you he purchased a certain lot of blueberries from wholesaler Jones. On visiting Jones, you will receive information that will lead you to the approximate region where the berries

were grown, even though you cannot track down the exact person. You will then find out what the cultural practices are in that section. Incidentally, you can hand out our booklets to these farmers to get them interested in the organic method. We will be glad to send you some.

The list of items discussed in the RODALE DIET so far, comprises:

FISH
KELP
MUSHROOMS
COCONUTS
WATER-CRESS
INDIAN NUTS (PINYON)
LICHEE NUTS
MULBERRIES
HUCKLEBERRIES
BLACKBERRIES
RASPBERRIES
PALM CABBAGE
WILD RICE
WILD GAME
CRANBERRIES
MAPLE SYRUP
HONEY
PECAN
NUTS, MISC.

J. I. RODALE.

Friends of ORGANIC GARDENING Can Help Build Its Circulation By Handing Out Our Free Subscription Booklets

Organic Gardening is constantly striving to increase its subscription list. It is important that we tell as many people as possible about the "goodness" inherent in organic gardening.

Perhaps you would like to take an active part in this important program by handing out our subscription booklets to friends, neighbors and acquaintances in your community. Even if you have never sold anything in your life . . . *if you are "sold" on organic gardening* . . . you will find it easy to turn an idle hour into interesting, stimulating and profitable dividends. If you would like some extra money, this spare-time activity will return liberal commissions. You don't have to give a sales talk or make a follow-up, for the booklet in itself will induce your prospect to subscribe. Through a coded coupon we can trace each subscription to your efforts.

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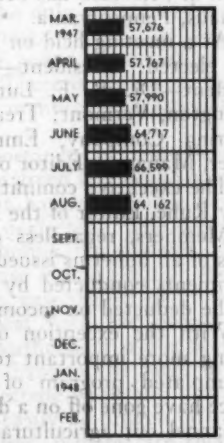

Watch this graph. It will give you an opportunity of seeing how our circulation stands from month to month.

SOLICITATION OF MEMBERS FOR

The Soil and Health Foundation

FOR a long time it has been felt that a scientific study of the relationships between soil, farm practices, and health should be made. Although there are many indications that artificial fertilizers are detrimental to the soil and to human health, sufficient data to prove these claims to the satisfaction of soil scientists are not yet available. At last a non-profit Foundation has been organized to make scientific studies of soil and health interrelationships. It is called the "SOIL AND HEALTH FOUNDATION" with headquarters at 46 South West Street, Allentown, Pennsylvania. The announced purposes for which this Foundation has been organized and incorporated are:

(a) To promote, foster and encourage the use of humus and other organic matter in order to maintain and improve soil fertility, to prevent soil erosion and improve the health of man.

(b) To conduct, engage in, foster and encourage scientific research and study and teaching, training, informing and educating the public, on and concerning the soil, foods and health of man—and their relation to each other.

(c) To study the effects of organic and artificial fertilizers on soil, plants, animals and man.

(d) In order to accomplish the foregoing purposes to establish, use, maintain and operate farms, schools, laboratories, experimental stations, publishing houses and all other appropriate agencies, means and instrumentalities.

This sounds like an ambitious program, and money will be needed to carry it out. There will be only one class of membership in the Foundation with no specified amounts for annual dues. All members will be known as *Associate Members,* and may pay as little or as much as they can afford. The first contribution of $1,000.00 has been made by the Rodale Manufacturing Company of Emmaus, Pennsylvania.

At a meeting held on the evening of October 7, 1947 the following officers were elected: President—J. I. Rodale, Editor of Organic Gardening; Vice-president—Dr. B. F. Lutman, Professor emeritus, University of Vermont, Burlington, Vermont; Treasurer—Joseph Rodale, President of Rodale Manufacturing Company, Emmaus, Pennsylvania; Secretary—Dr. William H. Eyster, Managing Editor of Organic Gardening.

The executive committee is to consist of J. I. Rodale, Joseph Rodale, and Percy Ruhe, Editor of the Allentown, Pennsylvania Morning Call.

Members, regardless of the amount of their contributions will receive copies of all bulletins issued by the Foundation giving the results of the various experiments conducted by the Foundation. All payments to the Foundation may be deducted on income tax returns.

With the exception of money contributed to your church, I know of nothing more important to you, to this country, and to humanity than the contemplated program of this Foundation. Practices based upon modern science have gone off on a dangerous tangent. There must be a brake, a control, to channel our agricultural practices to the best interests and health of the people. Will you help?

Send contributions to "Soil and Health Foundation", 46 South West Street, Allentown, Pennsylvania and membership certificate will be sent to you by return mail.

J. I. RODALE

How To Avoid A Famine of Quality

By SIR ALBERT HOWARD, C.I.E.

Editor of Soil and Health

WESTERN civilisation is suffering from a subtle form of famine—a famine of quality. This has arisen not from insufficient food to maintain that half-way house between robust health and death (so well described as a living death) which is now so common, but from the poor quality of our nourishment. One consequence of this malnutrition is to be seen in the steady growth of dental troubles which has accompanied the development of the Ministry of Health. To-day another Bill for dealing with the health of the nation has made its appearance, which is to cost some £150,000,000 a year and which will need a vast organisation of doctors and dentists. This will have to be created and controlled by the State.

The purpose of this paper is to suggest that the powers-that-be in dealing with the numerous casualties created by our present-day way of life are beginning at the wrong end, and that their well-meant proposals are certain to fail. This failure, however, will not be in vain : it is bound to lead to a reconsideration of the meaning of health and to a fresh start, beginning with the soil. The realisation of the fact that our most important crop is not so many measures of wheat or so many gallons of milk obtained in the cheapest way, but a race of healthy human beings with sound teeth, is therefore only a question of time.

What is the cause of this famine of quality and how does it operate? If we could answer these questions the door to preventive medicine might be open.

Proteins the Master Substances

The crux of this matter is to be found in the proteins, looked at in the mass. This collection of complex substances forms the matrix of the structures of all living things—plants, animals and man, as well as the microscopic forms of life. Life resides in the proteins. These bodies then help to confer on the organism the power to reproduce the species and to resist the invasion of parasites of all kinds. Proteins are therefore the master substances in life. They all originate in the green leaf and are created from simple substances—carbon dioxide, oxygen and the materials carried up in solution in the sap of plants—by means of the chlorophyll corpuscles and the energy of sunlight. Here we see the atom bomb factory (the sun) in perpetual action, and the creation of complex organic substances starting from carbon dioxide. These organic substances —starches, sugars, fats and proteins— must be looked upon from two aspects: (1) the stored energy they contain, and (2) the chemical elements which go to their formation. The organic materials made by the green leaf constitute the only source of food for all living things. They are also the basis of the power stored up in coal and in oil. There is no energy stored in artificial manures like sulphate of ammonia.

The importance of the proteins made by the green leaf needs no argument. What happens if this item in our food is neglected? The answer is disease, including the diseases of the teeth. Disease in one form or another follows from any neglect in providing the green leaf with the proper materials for synthesising stable proteins. Should this happen the huge protein molecules become weak and unstable: pieces may easily be broken off: these we call viruses. Viruses are therefore not the cause of disease but rather the indications of a famine of quality.

Two main causes are responsible for the production of unstable proteins:

(1) growing crops on worn-out soil and (2) introducing into the nitrogen cycle a substitute for humus in the shape of chemical fertilisers. Both these practices create a weak link in the protein chain between the soil and the plant which is carried forward to the animal, to mankind and then back again to the soil. Obviously attempts to put this right at the human end of the protein chain, by the help of a national health service, are bound to fail. *The new national health scheme therefore merely tinkers with trouble after it has happened and does nothing to get to the root of the mischief—the soil.*

How did this famine of quality originate? In two ways: (1) by improper methods of agriculture and (2) by the murder of our daily bread. These two factors must now be considered one by one.

The Breakdown of Agriculture

Ever since the year 1879, when a combination of the worst season on record and the importation of cheap wheat from the New World put an end to the system of mixed farming, which Coke of Norfolk did so much to establish, insufficient attention has been paid to the earth's green carpet and to the work of the green leaf. We have tried to make our proteins on the cheap side, as it were. A famine of quality has gradually set in which has been accelerated by the vast supplies of bastard nitrogen in the shape of sulphate of ammonia placed on the market by the makers of the explosives needed in the world war of 1914-18.

The Murder of Our Daily Bread

The importation of cheap wheat from the virgin soils of the New World did more than help to put an end to the golden age of British farming. This soon led to the murder of our daily bread by providing the roller mills at the ports with the very thing they wanted to incorporate some six per cent. of water in the flour and to sell the offals (which include the priceless germ, the bran and most of the minerals) separately at good prices. By removing the bran a white flour was obtained: the separation of the germ yielded a flour which would carry six per cent. of added water without going mouldy. To obtain a still whiter flour bleaching with chemicals was introduced—first nitrous oxide and then nitrogen trichloride (used in the so-called "Agene process"). Yeast foods in the shape of phosphates, and latterly chalk have also been added. The worst results of this sophistication have been: (1) interference with the powers of elimination leading to widespread constipation and the consequent auto-intoxication, (2) loss of the power of reproduction and of resistance to invading bacteria and (3) damage to the proteins by the nitrogen trichloride. The investigations by Dr. Weston Price indicate that one of the great causes of dental troubles is murdered bread. He has shown beyond any shadow of doubt in his *Nutrition and Physical Degeneration* that when primitive races with perfect teeth take to white man's food including plenty of white flour dental caries set in in a very few months. This is arrested when the patients return to their original way of life. The story of the islanders of Tristan da Cunha confirms Weston Price's findings.

On this island where food consists largely of potatoes (raised with organic manures), seabirds' eggs and fish, dental troubles are almost unknown. When the islanders visit South Africa their teeth begin to decay. When they return decay stops and some of the cavities begin to repair themselves.

Both causes of this famine of quality influence the protein. Chemicals lead to bastard protein: murdered bread means insufficient and even ruined protein. Either is followed by disease: a combination means disaster.

The present time is not the first occasion when England has suffered and then recovered from a famine of quality. This occurred in the fourteenth century when the manorial system of farming—created by the Saxons and afterwards converted into

the cast-iron framework of the Feudal System by William the Conqueror and his Domesday Book—collapsed in total ruin. The fertility of the open arable fields of the manors gradually wore out, the yield and quality of the wheat both dwindled. All kinds of diseases of crops, livestock and mankind, as well as rural unrest, followed, till, in 1347-8 and the succeeding years of the century, the Black Death, by wiping out some one-third to one-half of the rural population, compelled reform. Afterwards the Black Death, which was known as the Plague, died down in rural England but lingered on in the ports till the last outbreak of 1665 (followed by the Great Fire) occurred in London.

The Feudal System which had a place for everybody and kept everybody in his place broke down for want of the manpower to run it. Service to the Lord of the Manor gave place to rents: a new system of farming had to be devised. The worn-out arable fields were gradually enclosed by hedges and laid down to grass to feed the sheep which provided the wool for the looms of Flanders and Lombardy. After more than a hundred years under grass the vegetable residues of the earth's green carpet, activated by the urine and dung of the livestock, restored the humus content of the soil. When these fields were ploughed up the yield of wheat increased threefold or more. That an end was also put to the famine of quality which helped to cause the Black Death is suggested by two things—the gradual disappearance of this pestilence in rural England and the development of quality in the human population, as is indicated by the achievements of the men and women of the Tudor period. The genius of Shakespeare, the achievements of the rulers, statesmen and scholars of this epoch were only possible when the famine of quality of the fourteenth century was removed by the properly synthesised protein of the centuries which followed.

The Restoration of Fertility

To put an end to the present-day famine of quality we must follow in the footsteps of Medieval England and restore the fertility of our worn-out and over-stimulated soil. At the same time we must provide a supply of whole-wheat bread from the humus-filled soil. To achieve these two results the humus content will have to be rapidly increased. Attention must also be paid to the quality of this humus. As this undertaking proceeds we must reduce the quantity of artificials now used by some 25 per cent every year and thus get rid of them altogether at the earliest possible moment. To produce the large quantities of high quality humus needed, we must convert all our vegetable wastes, all our animal and human residues, all our town and market wastes (past and present) and all our seaweed into humus. This will involve the reform of our manure heaps on the farms, the full utilisation of sewage, the improvement of green manuring and a much better use of the temporary ley. By such means every acre of this island, including the hill lands, could be brought into full production. In five years Great Britian could feed her population and even begin exporting high quality food. In the meantime the famine of quality will disappear. The transformation of the new scheme for a National Health Service into a system of preventive medicine could then begin. The dental profession would have less tinkering to do and more time for real constructive work.

Dental Research of To-morrow

The greatest danger to avoid in future work is fragmentation—that curse of science, of administration, of education and of our present way of life. It has arisen because knowledge has grown at the expense of understanding. The inevitable result has been a plague of so-called experts, for the most part men and women who have wasted their lives in learning more and more about less and less, all

sublimely unconscious of the fact that at the end of the road along which they are traveling will be found the ideal expert—an individual who knows everything about almost nothing.

In the dental investigations of tomorrow, therefore, there must be no fragmentation. It must never be forgotten that our teeth are joined up with the solid framework of our bodies and are therefore part and parcel of mankind. They cannot therefore be considered apart and as a closed subject in themselves. Any diseases to which they are subject are mere symptoms of some deeper cause, one of the most obvious of which is the malnutrition which results from improper feeding. It may very well turn out to be the chief cause. It follows, therefore, that the dental investigations of the future must embrace the protein chain from the soil to man and back again, and the investigators must see to it that no defects in this cycle occur.

This brings the investigator into contact with the soil. The land which produces the food must be in the best possible fettle. The produce of that soil must reach the stomach fresh, whole and unsophisticated.

These conditions have hardly ever been realised in the many nutritional studies of the past. Insufficient care has been taken to secure quality food. The consequence is that the literature of the subject is littered with results which have no solid foundation and on which no firm conclusions can be based. They merely confuse the issue by a fog of technicalities.

How many investigators on nutrition realise the simple fact that it will take at least three years to convert any ordinary piece of land into a condition when it will produce quality food? This is only possible in this brief period if ample supplies of good farmyard manure or high quality compost are available. After three years under the new management vegetables and fruit, for example, acquire their full taste and flavour and the power to resist the onslaught of insect and fungous pests. The same applies to milk, milk products and meat. Only when the condition of an average herd of Jersey cows is raised to that standard when disease almost disappears is the best possible milk produced.

So much for the soil and its products. But what of the patient? Similar conditions apply. The patient, as is well known, contains reserves tucked away all over the body. Before a condition of robust health is reached these reserves must be raised to such a pitch that *under normal climatic and other conditions* the power to resist infection is the rule.

Only when real food is available and when the patients are fighting fit has the time come to observe the relation between nutrition and normal healthy teeth. If the investigation begins before these two conditions are satisfied the soil and the patients are both in a pathological phase and there is no firm base line from which the results can be measured.

Among the few dental investigations I have studied besides those carried out by Weston Price (on isolated communities in Europe and on primitive tribes in the New World and the Pacific) and by the dentists who have studied the teeth of the islanders of Tristan, there is one which is noteworthy in that the food used was grown on soil in the very highest condition as regards fertility. I refer to the work done during the last war by Mr. Brodie Carpenter at the Royal Commercial Travellers' School at Hatch End. Here the vegetables came from land which for many years had been heavily manured with night soil. I saw the land and the vegetables in 1945 and at once understood why Mr. Carpenter had obtained such dramatic results in such a short time. There had been no delay as far as the produce was concerned: the only time factor was the period needed for the children (who had obviously been suffering from a famine of quality) to build up their depleted reserves. Once this was done the excellent vegetables

soon put an end to the caries. The result was so sudden that Mr. Carpenter himself was almost taken unawares. It was reminiscent of the way patients often pass from the condition of convalescence to normal activity.

The Next Step

Where can the future investigations that are needed on teeth be best conducted? The answer is simple—in our preparatory and other schools and in training centres of all kinds which possess sufficient land alongside for growing their vegetables, fruit, milk and other foods on soil in good fettle. Attention should also be paid to the bread and wheat porridge. These must all come from humus-filled soil to which no artificials are applied. No flour should ever come into these private bakeries—only wheat which should be ground as required and used for bread and other purposes. In such institutions an ample supply of quality food is essential because it is needed for nutrition and also for growth and development. The dentists attached to such centres can do much to help the cause of preventive medicine.

Some of the depots of the Navy, Army and Air Force already possess the land and labour needed for growing a large portion of their own food. An outside supply of compost-grown wheat could easily be arranged for their bread. Here large-scale demonstrations on nutrition could be carried out. The results obtained with wholewheat bread, for example, could easily be extended to ships at sea, which should always carry their stocks of cereal in the form of wheat and grind it as required. The dentists who work in these defence organisations could do much to initiate reforms in feeding which would in due course filter through to the general public. Much attention is now being paid to the education of our defenders. It would be easy to use these defenders on their return to civil life to educate their masters—the taxpayers.

Two other openings lie ready to hand—in the meals provided in our Elementary Schools and in the activities of the Boy Scouts and Girl Guides.

At a few carefully selected Elementary Schools real meals should be the rule. *The produce including the bread and the milk should come from humus-filled soil and should be consumed fresh.* At the beginning and again after the reserves of the malnourished children have been built up, their teeth should be examined and the figures recorded. The results will tell their own story: they will need no argument: a case for resolute action will have been provided.

At one or two selected centres similar ideas should be introduced into the Boy Scout and Girl Guides movements. But here the demonstrations should go far beyond the provision of quality food. The members of these organisations should learn how to grow and to cook high quality produce. Only in this and in similar directions can these two movements hope to realise the dreams and the ideals of the great man to whom they owe their existence. They must avoid stagnation: they must devise new and fruitful undertakings in which they can constantly learn by doing.

What can be done to secure the support of public opinion? I suggest that a beginning should be made by the British Dental Association by gathering together the pioneering work of Weston Price, Brodie Carpenter and others into a handbook which would not only establish a case for action but also help the public to realise what vast possibilities for good preventive dentistry has in store. If this is not possible, then an ample supply of copies of Weston Price's book might be imported from the U.S.A. and stocked in all the lending libraries of the country. But the ideal would be a shortened edition of *Nutrition and Physical Degeneration* brought up-to-date by means of an inspiring introduction.

Organic Soils Versus Mineralized Soils

By DR. E. E. PFEIFFER

THERE is a little confusion in terminology which must be cleared up before entering our subject: "Why Are Fertilizers Fertile?"

Fertilizer is a term indicating any product added to the soil in order to increase its fertility irrespective of whether it is a mineral fertilizer such as Phosphate (rock and super-phosphate), lime, dolomite, a patent formula (8-12-4 or others) or an organic fertilizer such as manure, compost, dehydrated manure, peat, etc.

We would like to define: manure equals all matter deriving from animals; compost equals a mixture of earth and decaying plant matter; mineral fertilizer equals all products of mineral origin, whether chemically prepared like superphosphate or of natural derivation as lime, rock phosphate, dolomite. Commercial fertilizer is in general the term for any product sold to farmers or gardeners by feed and fertilizer stores.

In the following we shall be dealing exclusively with commercial mineral fertilizers and wish to explain why they are so "fertile" and still do not satisfy the needs of the plants nor those of the organic gardener.

Minerals, of course, are part of the soil. Soil, however, consists besides the minerals, of air, water, organic matter, humus, and plant and animal organisms. Even by weight the minerals comprise perhaps only half of the cultivated surface soil. The deeper one goes into the subsoil strata, the less organic matter and air are found, but the higher is the mineral content.

Some of the minerals are in the form of rock, stones, gravel, small particles, sand, i. e. in a more or less insoluble form. These are slowly and gradually broken down by the weathering process, by frost, water, chemical agents, plant roots, microlife. Part of this process of decomposition produces soluble minerals, salts, which are easily transported by water and absorbed by the plant roots.

The entire chemical fertilizer theory deals almost exclusively with the water soluble part of the minerals. Rocks, stones, gravel are inexhaustible reserves of the soil, since the constant weathering process mobilizes new material and replenishes, at least to a certain extent, minerals which are used up by crops and lost by being washed away. However, these mineral resources can be manifold or limited according to the type of original rock. Granite, gneiss, porphyrous or igneous rock, volcanic rock are rich in minerals such as silica (SIO2), potassium, sodium and iron and some of them are rich in manganese and magnesium. These minerals are poor in lime. Aluminum is present as an oxide in clay or loam. Limestone is very rich in lime (calcium carbonate) and dolomite is rich in calcium and magnesium carbonate. If we were forced to rely entirely upon the weathering process of primeval rock we would have to wait a long time, for this decomposition moves slowly. Limestone deteriorates more quickly in the presence of water-

containing bicarbonate (deriving from soil life) but is deficient in other minerals. Porphyrous and volcanic rock are usually rich in minerals except for lime, and decompose quickly.

Throughout the centuries nature has mechanically and physically decomposed original rock and provided a top layer of more or less soluble, rich mineral matter aided by the organic humus-forming process and soil life—a process which has finally led, in places, to the formation of fertile topsoil.

Plants absorb these water soluble minerals through their roots. They grow faster and yield more heavily if more soluble material is present. If, for any reason, no water soluble potassium, phosphate, nitrate or calcium are present then plant growth is retarded and handicapped. The reason may be the absence of water (in desert soils which are sometimes rich in potassium, nitrates, etc.) or the absence of one or all of the important minerals.

At this point we can see why mineral fertilizers are sometimes so successful. They bring easily soluble salts to the plant roots and stimulate the growth processes. However, conditions must be such that there is enough moisture in the soil to keep the salts in solution. If there is too much moisture then plants grow too fast, produce weak stems and leaves. Grains lodge easily on heavily fertilized fields when there is much rain. Then too, fast-growing plants do not have time enough to absorb some of the essential but less soluble substances (trace elements, silicates) and develop one-sidedly. If there is not enough moisture then plants cannot make use of soluble mineral fertilizers. Thus fertilizers "show up" best in moist soils (irrigated land, bottom land, flat canalized land like Holland) and most poorly in drought areas or if applied in late spring and followed by a drought.

Plants grow sturdy, more resistant, have time to absorb more nutriment and build up more refined substance (vitamins for example) when they grow slowly. Their composition is better balanced too when they have time to develop rather than when they are pushed. This is the case when plants grow in humus, i. e. in organic matter mixed with the mineral soil. Here they develop more and finer hair roots than in a "nutritive solution". They are not overfed at one time (rain) and starved at another (drought), but the soil holds its moisture absorbed by the humus, and gives it slowly up to the plants, securing, therefore, a much more balanced growth. A humus soil holds two and one-half times its weight in moisture while a mineralized soil holds not half its weight in water.

(In the human realm we know that children who grow too quickly are subject to heart and circulatory troubles and succumb to strain much more easily than slow growers.)

But there are at least two other problems which must be considered. No doubt one can obtain yields with mineral fertilizers if the conditions are right. One can even obtain yields when the soil is poor but enough moisture is present to keep the fertilizer in solution. The one problem, however, is how long does this effect last, and what changes may occur in the soil?

In the beginning we said that it is the slowly decomposing natural rock and other solid minerals in the soil which give up steadily but slowly—soluble minerals to the soil solution. Now there is an important rule in chemistry the principle of which every reader can demonstrate to himself with a little experiment. Take a glass of carbonated water and drop half a teaspoonful of salt into it. What do you see?

The rule is that in a system of various minerals in solution the easily soluble minerals displace the less soluble minerals. There is a balanced state. If we add easily soluble salts some of the less soluble minerals are displaced and become precipitated. In the case of the soil they are taken out of circulation. If we feed plants with mineral fertilizer then it is possible that the weathering process of the

original rock will be slowed down. Humus, again, on account of its high absorptive factor is the solution, for it maintains the balance and acts as a buffer. If the easily soluble salts, according to this rule, are absorbed, then the less soluble ones go into solution. A wet year, therefore, takes more out of the soil than a dry year. This is demonstrated in desert soils which our laboratory has recently analyzed and which were very rich in minerals accumulated over the years. Irrigated soils without humus are the most quickly depleted. In other words too high a content of soluble minerals can reduce the natural process of weathering replacement. The plants must then rely entirely on "artificial" feeding.

An interesting case is the discussion of superphosphate versus rock phosphate. Agricultural chemists are pro super against rock because the superphosphates dissolve easily and quickly. Rock phosphate dissolves slowly. The question is, however, are the soil conditions such that supers remain soluble? Or what happens in a humus soil which gives up its minerals slowly? Rock phosphate may very well be mobilized by soil life and bacteria. In a mineralized soil the superphosphate may "show up" quickly, too quickly perhaps. In a fertile organic soil teeming with humus and bacteria, the "rock" may be dissolved to the extent that is needed and the rest may be retained. Here is a main difference between a mineralized, dead soil and a living soil, namely the different behaviour as regards solubility and maintaining a balance. Mineralized soils do not hold "fertilizer". They wash out easily (erosion). More and more minerals in soluble form have to be added from year to year for replacements of the losses. Organic humus soils "hold" their fertility.

Our soil chemistry has been studying and finding its rules too frequently in the test tube system of nutritive solutions with easily soluble materials, while nature works with an organic, colloidal system, living organisms where conditions are entirely different. The question should be answered as to why we observe deficiencies in mineral soils and why soils rich in bacteria are usually and naturally high in nitrates and phosphates?

Liming is an interesting example of what can take place in the soil. Lime is calcium carbonate (ground limestone f. i.) and necessary particularly for legumes. Calcium carbonate is not soluble in water, but calcium hydrocarbonate is. The latter is formed in the presence of carbon dioxide. Carbon dioxide is a product of soil life, i. e. of the breathing process and metabolism of micro-organisms in the soil. Lime is thus made available to the plant roots by soil life. A mineralized soil can use only as much lime as purely physical conditions allow. If these conditions are poor (in a dead soil) much lime can be given with little effect. The lime remains inert, precipitated and is eventually washed downward. I have seen soil samples where a lot of lime was applied (up to two tons per acre), the samples were still acid and calcium unavailable. On the contrary I have seen live, humus soil to which much less lime was applied, and yet the soil was neutral and the calcium mobilized. This is our first point: availability and solubility of minerals in a balanced organic soil versus conditions in a dead mineralized soil. In the latter case fertilizers are really "fertile".

The second point we would like to emphasize is the wisdom of stimulating nature's own resources from which plants can draw. The more numerous and finer hair roots plants develop, the better they can draw upon the natural resources. This is the case in a humus soil. Just dig out a few plants and study to what extent the root system is developed. This will give you a good lesson.

Nitrogen is important for growth, the formation of proteins and seeds. Plants make use of nitrates and ammonia. Nitrates are preferable for they

are more stable than ammonia. Nitrites are the product of the decomposition of organic matter and may easily be lost. Nitrates are formed by certain nitrogen fixing bacteria the most important of which are the bacteria in the root nodules of legumes. Here there is a natural process which provides all the needed nitrogens. These bacteria do best in a neutral soil rich in humus. They work best, too, if no nitrates or ammonia are brought to them from outside. If nitrogen fertilizer such as sulphate of ammonia or nitrates are applied they cease their activity. Every bacteriologist knows that he cannot grow nitrogen fixing bacteria on a medium which contains nitrogen. Legumes grown on fields with heavy nitrogen fertilizing do not develop root nodules but take all the nitrogen from the fertilizer. There we have the choice of either working with nature or of adding something artificially, against nature. An acid, badly balanced soil, however, may need nitrogen fertilizer for no nitrogen fixing bacteria will grow in it. Manure and compost (the latter saturated with lime) however, and proper aeration of the soil will counteract acidity and restore such conditions that the nitrogen bacteria can again work.

It is frequently said that the friends of organic and biodynamic methods in farming and gardening are against mineral fertilizers and soil chemists are sore at them for that reason. Our point of view, however, is a little different. We are against conditions in the soil which only mineral fertilizers can help. We want, first of all, to restore such natural conditions of organic matter and humus in the soil that nature can do her best by means of well-balanced, living conditions. Then only will it be evident how much "mineral correction" is needed, if any. A well-balanced humus soil preserves and mobilizes its resources, while we may deplete an unbalanced mineralized soil in spite of the addition of fertilizers. The proper organic state of the soil is the primary factor.

Kodachrome Slide Library

READERS OF THE ORGANIC GARDENING Magazine are invited to help build a Kodachrome (colored) Slide Library concerned with all aspects of Organic Gardening and Organic Farming. We are especially interested in stages in the construction of a compost heap, views of organic farms and gardens, vegetables, fruits, seeds. We will pay $1.00 for each slide that we accept for the Organic Gardening Library. We hope that many of our readers will cooperate with us in this library.

The once majestic Chestnut is on the way back—Plant breeders are combining the good qualities of the American Chestnut with the *blight resistance* of the Oriental varieties. McFarland

The Early Study of Plants Was Concerned With Foods and Health

By DR. WILLIAM H. EYSTER

(EDITOR'S NOTE:—This is the first of a series of articles concerned with plant life. A general knowledge of the kinds of plants that inhabit the earth, how they originated, how they live and reproduce, how they are distributed from one place to another, why they live in particular regions and not in others, the interrelationships of plants with each other and with animals, plants in relation to man's habitation on the earth, and other similar topics may serve as a master key which will unlock the doors that lead to a fuller understanding and a keener appreciation of plants which make the surface of the earth a suitable habitation for man. These articles will eventually be published in book form.

INTRODUCTION

THE study of plants by man began long before he was a rational being. The word Botany is derived from a Greek word meaning feed or fodder and indicates that man was first interested in plants as sources of food. Since this simple beginning of plant study in the remote past, vast bodies of facts concerning the structure, life processes, interrelationships, distribution, and economic uses of plants have been accumulated and are now included in the study of Botany. Accordingly, we may define Botany as the *Science of Plants*, which is concerned with everything relating to plants, whether in the living, dead, or fossil condition.

The Beginnings of Plant Study.

All animal inhabitants of the earth, including man, must choose, instinctively or more or less intelligently, their food plants. Most of our important food plants were selected and developed by prehistorical peoples who left no written record of their achievements. The earliest written account of plant study to come down through the ages to us was left by King Solomon, who lived some 3,000 years ago and "spake of trees from the cedar that is in Lebanon, even unto the hyssop that springeth out of the wall." Primitive man was obliged, though perhaps unconsciously, to classify plants into those that were wholesome and those that were injurious, for, in their struggle for existence, the problem of food supply was a crucial one. What was good to eat and what was not was knowledge that each individual had to gain for himself, perhaps from bitter experience; but in the selection of the plant whose powdered root or leaf decoction might restore his health or heal a wound, he was more fortunate in that he could consult the *Medicine Man.*

The Medicine Man.

All primitive peoples have their medicine man who rates among the most important individuals in the

tribe. They seem to believe that diseases are curses that are inflicted upon them by some supernatural being and that they can find relief only by consulting the medicine man who, they suppose, has confidential dealings with the deity on the one hand and an expert knowledge of all plants on the other. It was believed that every kind of disease or wound could be cured by the extract of some native plant. This belief led to the study of all kinds of native plants. The medicine men made extensive collecting trips to study the distribution, characteristics, properties, and especially the medicinal virtues of all native plants. After a time the medicine men considered the collecting of plants beneath their dignity and importance in the tribe, so that they turned this aspect of their work over to a new group of herbalists called the *rhizotomoi* or root collectors. The root collectors were forever experimenting upon themselves to discover the medicinal virtues of plants not previously used in the curing of diseases. When new plants were found that had medicinal values, it was good business for them because they knew how to recognize them, where they grew, and how to prepare them for the medicine man. When we reach historical times, the medicine man of the more progressive peoples had given up the handling of the herbs and had become the physician who had taken up his residence in the main avenues of the principal cities where he met his patients and prescribed for their ailments. Then came into existence the *pharmacopolai,* or drug sellers, who lived in the alleys of the cities where they bought the herbs from the root collectors, and prepared them and sold them either to the physician or to his patients.

It should be remembered that these early plant studies were made hundreds of years before the appearance of the printed book, and the root collectors, drug sellers, and physicians had to depend, for the necessary knowledge of the medicinal plants, upon laboriously copied manuscripts of their predecessors or upon the oral descriptions handed down from father to son, or from master to apprentice and upon constant association with the master in the collection and preparation of the herbs. There is little wonder that there was so much confusion and misunderstanding concerning the identity and medicinal virtues of plants on the part of those primitive botanists of long ago. Clearly, what was needed was an accurate description of plants in a precise terminology. Before the herbalist and physician could be sure of their ground, a botanist had to be created.

Before tracing the development of plant study into the science which we now call Botany, let us, as did the primitive medicine man, give some consideration to the effects that plants have upon our health. A new understanding of the effects that plants have upon the prevention and cure of human diseases was initiated by Dr. Casimir Funk who, in 1912, isolated the substance which prevents and cures beri-beri. To this substance he gave the name *vitamin.* Since then we have learned that there are as many levels of health as there are levels of sickness; that a high vitamin intake means a high level of health and that a low vitamin intake means a correspondingly low level of health; and that a deficiency of vitamins means a rapid onset of deficiency diseases and death. Vitamins control and regulate the body's utilization of proteins, fats, carbohydrates, and minerals. In view of our present understanding of the effects of vitamins on our health, we are compelled to regard the medicine man of old as more than a mere ritualist. Vitamins are as important in human nutrition now as they were in prehistoric times. We must get the vitamins essential to a healthy body either from native plants which contain them or from cultivated plants which are grown in such a way as to contain the vitamins in sufficient amounts.

The Early Greeks and Romans.

The first botanist of note was Theophrastus, a pupil of Plato and Aristotle, born in Lesbos in 372 B. C. Theophrastus wrote a *History of Plants* which included the descriptions of about five hundred plants that were used in restoring and maintaining the health of the people of his time. This history supplied a long-felt need on the part of herbalists and physicians.

About 64 A. D., Discorides, a well-known Greek physician, wrote a *Materia Medica* which continued to be regarded as an authoritative reference for sixteen centuries. Although his book was concerned primarily with medicinal plants, the plants were grouped into natural families.

Rome also had a share in the early development of Botany, especially through the contributions of Pliny the Elder (23-79 A. D.), who compiled from Greek authors his *Historia Naturalis* which includes crude descriptions of approximately a thousand plants, many of which were valued for their medicinal virtues. Galen (131-200 A. D.) also compiled a *Materia Medica* and strongly advocated that all physicians should acquire a knowledge of useful living plants.

The Middle Ages.

The Middle Ages represents a period during which very little was written in any of the great fields of learning. During this period the human intellect was restricted by a deference to authority in every phase of life. Men no longer cared or dared to investigate, but relied upon the writings of the ancient Greeks as sources of knowledge. Those who did make observations did not feel free to accept the findings of their own senses when they did not agree with those of the ancients. The contributions of Theophrastus, and especially his spirit of inquiry, had to be reborn before additions could be made to our scant knowledge of plant life.

THE REVIVAL OF INTEREST IN BOTANY

After Galen very little progress was made in the study of plants until about the middle of the fifteenth century when there was a revival of interest in practically all fields of knowledge. Even at this time plant study was almost entirely associated with the practise of medicine. Many people believed that Providence had caused particular plants to grow in those regions where the diseases which they cured were prevalent. This belief stimulated great interest in the study of all kinds of plants.

Botanic Gardens.

The first botanic gardens were concerned entirely with the growing of medicinal plants. The first botanic garden of which we have record was established in the ninth century A. D., but it was not until the sixteenth century that botanic gardens were generally established. Many of the now great botanic gardens were founded by universities as adjuncts to schools of medicine. At the end of the eighteenth century there were approximately 1600 botanic gardens in Europe alone. These gardens did much in the way of advancing our knowledge of plants. As plant study developed into a science, the botanic gardens admitted plants of all kinds and from all parts of the earth. For example, the botanic garden of the University of Berlin includes a New Jersey swamp.

Herbals and Herbalists.

In the sixteenth century much interest in plant study was aroused by the appearance of a number of books called *Herbals* which consist of descriptions of plants with special refer-

ence to their medicinal virtues. The first Herbal of note was written in 1530 by Otto Brunfels (1464-1534) who had been educated for the Church and was interested in theology, pedagogy, medicine, and plants. His plant descriptions were taken from the writings of the ancient Greeks and are illustrated by elaborate woodcuts. The second Herbal that deserves mention was written by Leonard Fuchs (1501-1566) in 1542 under the title *Historia Stirpium*. It consists of little more than an alphabetical list of medicinal plants, but contains excellent woodcuts. In 1546 appeared an Herbal under the title of *Kreuter Buch* written by Hieronymus Bock (1498-1554). The descriptions of Bock's Herbal are superior to those of the others which preceded his because he lacked funds to have woodcuts made. To make up for this deficiency Bock made careful descriptions from his own observations of the plants themselves instead of taking them from the writings of the ancient Greeks.

THE FOUNDATIONS AND DIVISIONS OF MODERN BOTANY

Modern Botany may be said to have begun with Valerius Cordus (1515-1543) who was among the first to recognize the importance of describing plants anew from Nature. While still a mere youth, Cordus traveled extensively among his native hills and mountains and described about five hundred species of plants. Unfortunately, Cordus died soon thereafter and this promising young man's career as a botanist was ended.

Plant Taxonomy—
The Classification of Plants.

Botany was finally divorced from Materia Medica by Andreas Caesalpinus (1518-1603), an Italian, who proposed to study and classify all plants regardless of their economic values. Such was the beginning of Plant Taxonomy. A century later, in 1682, John Ray (1628-1705) presented a classification of plants which distinguished between plants that do not bear flowers and plants that do bear flowers, and divided the flower-bearing plants into 1) Monocotyledons whose seeds have one cotyledon and 2) Dicotyledons whose seeds have two cotyledons. (The embryonic leaves in the seed are called cotyledons.) These great classes of seed plants were divided and sub-divided, according to the structural characteristics of their flowers, into natural *orders* and *families*. A few years later, in 1694, Tournefort, a Frenchman, published a classification of plants based almost entirely upon the structure of the flower, and introduced the *genus* as we understand it today.

The greatest taxonomist of all was Carl von Linné, commonly known as Linnaeus, who lived from 1707 to 1778. Linnaeus thoroughly revised the principles of classification and established the *binomial system* of naming plants and animals. This system is still in use. According to this system, every organism known to science, regardless of whether it is a bacterium, a fungus, an alga, a tree, or an animal that is large or small, is given a name consisting of the name of the genus followed by the name of the species expressed in Latin. This is known as the organism's scientific name, and is the same in all countries of the world regardless of national languages. For example, the scientific name of the meadow buttercup is *Ranunculus acris*, and that of man is *Homo sapiens*. Meadow buttercup is understandable only to English-speaking peoples, while *Ranunculus acris* and *Homo sapiens* are understandable to all

peoples of the earth regardless of their native tongues.

Plant Taxonomy, or Systematic Botany as it is sometimes called, is concerned with the identification, naming, and classification of plants according to their genetic relationships. Its object is to describe and name all the kinds of plants that can be distinguished, and to arrange them, according to their genetic relationships into the groups or categories which we call *divisions, classes, orders, families, genera,* and *species.* The most closely related plants belong to the same species while the most distantly related ones belong to different divisions. Within a species there are many differences, some of which are genetic and thus hereditary while others are due to differences in the environment and are not hereditary. Since plants frequently hybridize in Nature, and, in consequence of this, give rise to innumerable new forms, *Genetics,* the study of the origin and inherent relationships of individuals, has recently come to play a most important role in the determination of plant relationships. Plants also may vary widely with changes in environmental conditions, so that *Plant Ecology,* the study of plants in relation to their environment, is important in the study of systematic botany. Taxonomists have learned much about the relationships of the plants which now inhabit the earth from studies of fossil remains of the plants of earlier geological eras so that *paleobotany* bears a close relationship to systematic botany.

Plant Morphology—
The Structure of Plant Bodies.

The successful grinding of magnifying lenses in the seventeenth century made possible a study of the minute structure of plant bodies. Robert Hooke (1635-1703) examined sections of charcoal, cork, and a great variety of other plant tissues and observed as early as 1665 that they are "all porous and perforated, much like a honeycomb." These pores were named cells by Hooke.

While Hooke was studying promiscuously all sorts of plant and animal tissues, Nehemiah Grew (1641-1712) of England and Marcello Malpighi (1628-1694) of Italy were systematically examining and drawing plant tissues under the microscope, and were thus laying the foundations of *Plant Morphology.* It remained for Matthias J. Schleiden (1804-1881) to discover and announce the generalization that all plant bodies are made up of cells and cell products. Wilhelm Hofmeister (1824-1877), the greatest botanist of his age, finally placed plant morphology on a modern scientific basis. Although Hofmeister made many fundamental contributions to botanical science, he will be remembered for the following three outstanding discoveries: 1) the origin of the egg, the nature of fertilization, and the formation of the embryo in flowering plants; 2) the alternation of a gametophyte and a sporophyte phase, referred to as the *alternation of generations,* in the life cycle of plants; and 3) the theory of the common descent of all plants.

Plant morphology, as we understand it today, includes *Anatomy,* the study of the internal structure of plant bodies; *Histology,* the detailed study of tissues or groups of cells which have a common function; *Embryology,* the study of the growth and differentiation of individual plant bodies; and *Experimental Morphology,* the study of the causes underlying variations in form and structure.

Plant Physiology—
The Study of the
Life Processes in Plants.

The earliest studies of the life processes of plants consisted almost entirely in attempts to find homologies between the physiological processes in animals and plants. One of the first persons to make such comparative studies was Stephen Hales (1677-1761) who tried to understand plants in terms of the life processes of animals. The discovery of oxygen gas in 1774 by Joseph Priestley (1733-1804)

opened the way for important advances in the study of plant nutrition, for, within five years, Jan Ingen-Housz (1730-1799) recognized the significance of the gaseous interchange between the leaf and the atmosphere in connection with photosynthesis and respiration. In the early years of the nineteenth century, Theodore de Saussure (1767-1845) extended the work begun by Ingen-Housz along what might be considered modern laboratory lines. While DeSaussure was carrying on experiments in plant nutrition, Thomas A. Knight (1758-1838), an English horticulturist, was studying the responses of plants to such environmental factors as light, moisture, and gravity. Plant physiology made its greatest advances under the influence of Julius von Sachs (1832-1897) and his students, who may be considered the founders of the modern school of plant physiologists.

Plant physiology endeavors to explain, in terms of physics and chemistry, all life processes concerned in the growth and development of individual plants, and in the production of new individuals in successive generations.

Experimental Evolution and Genetics.

The *Origin of Species* by Charles Darwin (1809-1882), published in 1859, doubtless has influenced biological thought more than any single book that ever has been written. It brought into general acceptance among scientists and thinking people the theory of *organic evolution* and provoked lines of thought which have led to our present sciences of *Experimental Evolution* and *Genetics*. Darwin stressed the importance of variations and heredity in evolution, but it remained for Gregor Johann Mendel (1822-1884) to discover the Laws according to which characteristics are transmitted from parents to offspring. Although Mendel's *Laws of Inheritence* were published in 1866, they were not appreciated until 1900 when three eminent botanists again brought them to the attention of biologists. Mendel's work has opened the way to an understanding not only of the genetic relationships of living organisms but of the very nature of life itself.

Economic Botany—
Plants in Relation to Man.

The study of plants in relation to the uses that are made of them by man constitutes *Economic Botany*. Its principal subdivisions are *Agriculture, Forestry,* and *Pharmacology*. Some of the special phases of agriculture are *Soil Science*, the study of soils in relation to the growing of plants; *Agronomy*, the study of farm crops; *Plant Breeding*, the production of new varieties of plants by hybridization; *Plant Pathology*, the study of the diseases and insect pests of plants; *Horticulture*, the study of fruit growing under cultural conditions; *Olericulture*, the study of the growing of vegetables for foods; *Floriculture*, concerned with the growing of ornamental plants; and *Landscape Gardening*, the utilization of plants for beautifying man's environment. The study of any of these practical botanical sciences must necessarily be preceded by a thorough training in the fundamental principles of taxonomy, morphology, and physiology.

The plants which are so small that they can be seen only with the aid of a mircoscope live, for the most part, in the soil and are absolutely essential to the life of all higher forms of life. They are of especial interest to organic gardeners for they convert plant and animal residues to humus which is rich in plant nutrients and represents the perfect fertilizer. The minute plants are as important to the gardener and farmer as his cultivated crop plants and his domesticated animals.

******

The next article will be concerned with an INTRODUCTORY SURVEY OF THE PLANT KINGDOM. Reading this article will be like watching a parade of all plants before you, varying from the microscopically small bacteria to the giant Sequoias of the Pacific coast.

The Garden of Ling Chaing

(From an old Chinese tale)

Re-told by ROGER W. SMITH

IN all China in those days there were few men who were poorer than Ling Chaing yet he had the most beautiful garden in his province. Many tales are told of Ling Chaing; that he lived upon the fragrance of his flowers, that the wild birds flew away when a stranger approached but loved to sing perched upon Ling Chaing, busy at his work. It was even said that the trees communed with him when he stood beneath their branches of a summer day.

Visitors from afar came to sigh over the beauty of Ling Chaing's garden. Eventually the rich local mandarin came also.

Most of the area surrounding Ling Chaing's fine garden was very poor—and the wealthy mandarin made plans. No one in the province should have a more beautiful garden than his.

Ling Chaing approached the personality of the mandarin, his distinguished visitor, with many bows. "I hope my poor garden pleases your highness," he said.

"It does," said the mandarin shortly, "but I'm here on a matter of business. I've recently taken over much of this section. I'm willing to pay you much more than I paid your neighbors because your garden is so beautiful."

"A very generous offer." Ling Chaing bowed again, his rough burlap clothes rubbing against his smooth sun-tanned skin.

So Ling Chaing lost his wonderful garden, the garden in which he had toiled so faithfully. With the little money the mandarin had given him he took a place nearby. He built him another hut where he could sleep. And the mandarin sent down his own gardeners to take over and care for the garden Ling Chaing had quitted.

Before many seasons had passed the garden Ling Chaing had left was no longer beautiful, the trees no longer flowered, the birds no longer sang. Ling Chaing had already established a new garden more beautiful even than the old one.

And the neighbors whispered. Magic, they said. The trees and flowering shrubs moved secretly during the night. The plants followed the gardener they loved.

Visitors came from far and wide to view the new garden of Ling Chaing—and, of course, the wealthy mandarin was furious.

The mandarin was fat and well-fed, Ling Chaing was thin and poorly clad when they met. "I proclaim this my official garden", he announced to Ling Chaing. "And I appoint you my official gardener."

And Ling Chaing, tanned and almost nude, knew that the mandarin had been defeated. From now on, the mandarin would be forced to pay him a fine salary.

But despite his fine standing and his fine salary, Ling Chaing continues to live in the modest hut he himself built and to work with his own hands his garden.

Sometimes the neighbors wonder why Ling Chaing does most of the work in his garden himself when he has a fine salary.

Then someone will comment; "When Ling Chaing works the wild birds come and sing for him. His plants love him. When that fat fool the mandarin pays the garden an official visit the song birds are silent."

"Out of respect," someone may add cynically.

However these things may be, Ling Chaing is happy in his garden which is the most beautiful of all, and the wealthy mandarin grows each day stouter and more dignified.

One of th Vi

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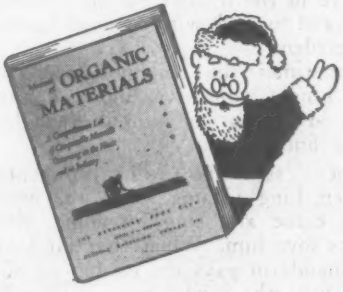

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ORGANIC GARDENING WILL SOLVE YOUR GIFT PROBLEM!

Vinca minor edged with boxwood McFarland

Other Ground Covers

By J. HORACE McFARLAND

AS Breeze Hill becomes more and more crowded with the plants I have tried to make almost double up in their space occupation, I find myself importantly interested in ground covers. I have told perviously of a number that I like very well, including periwinkle, pachysandra and hardy ivy, but I have not said anything, I believe, about the great advantage I get from *Viola striata,* a pleasing white-striped violet which blooms through a long violet season, and then breaks out a little later, while providing an abundance of round clumps that are used at Breeze Hill to fence a curve. Right now I am engaged in an endeavor to compensate for my own anxiety to have clean grass walks in the rose garden by planting the remaining strip next to the vigorous box edging with *Rosa rouletti,* and while this is now only in an experimental stage, I am not a bit afraid of its success for I have noticed that if *R. rouletti* is treated with sufficient indifference and roughness it will keep low in growth, and will bloom nearly all the time, while having a very attractive appearance on the ground cover basis.

I have had to contend for many years with a rough slope away from the house on which I tried to grow

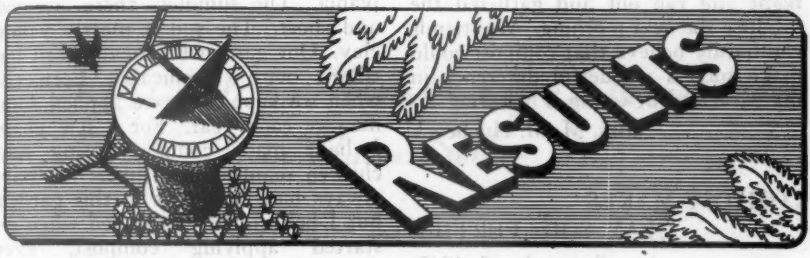
things that would not grow, then succumbing to the placing of a woodpile at the north side of this area as some excuse for the housekeeping end of things. All bother has disappeared, however, since I set in this area enough plants of the "Hills of Snow" form of *Hydrangea arborescens,* previously mentioned in these papers. These plants, not permitted to get very tall, do form a completely satisfactory, and indeed delightful, defense for the hillside, in which I may prune as I please any time, feeling sure that the fine plants underneath will respond with a burst of foliage, and in due time with some good white flowers.

As a very effective ground cover, especially in the shady places which have come to prevail at Breeze Hill whether I like it or not, I am using with satisfaction *Rubus odoratus,* the Flowering Raspberry, a Pennsylvania native which is shared with the Atlantic Coast all the way from Nova Scotia to Georgia. It has nothing whatever of the particular charm of the ground-hugging plants I have mentioned, but does provide a pleasing incident where used with intelligence and given mighty little attention. It *is* a raspberry in that the abundant pink flowers are inevitably followed by what Bailey's Hortus Second calls fruits that are "red, flat, dry, not eaten." I will admit to having occasionally eaten one of them, being an omnivorous animal, but without any particular satisfaction, because the fruit is tasteless, but decidedly ornamental when it happens.

Now this shrub is mentioned as a good ground cover, not for its flowers or fruit but for its distinctly excellent habit of giving agreeable, long-continuing, good-looking greenery in half shady places, or occasionally in full shade. If I get around to it, an annual pruning is given, which means that at the tail-end of the winter I cut out the old sticks and let the young shoots come up, knowing they will arch over and make the pleasing effect I need. This Flowering Raspberry is very much easier to manage than any rose I know, and it is also easy to transplant and to give away. I have commended it to friends who like the broadly responsible foliage it provides, whether or not they see the deceptive fruit.

Hybrid Corn

THE GEORGIA EXPERIMENT STATION reported in January on corn yield tests. The promising Tennessee 10, " a very promising hybrid for north Georgia" led in most trials, but did not produce significantly higher yields than Neal Paymaster, the highest-yielding open-pollinated variety. If a less costly open-pollinated variety is just about as good as a hybrid produced at great cost and some waste, one wonders if breeding high-yielding open-pollinated corn varieties may not have the better future.



COMPOST FOR MUSHROOMS AND GARDENS

August 14, 1947.

I am more and more impressed and fully convinced about the superior method of Organic Gardening over all other methods. Permit me to add that I have gathered sufficient examples of the value of compost from my brother who has been in the Mushroom Business for 15 or 16 years, and who has recently become an organic enthusiast. He has repeatedly told me of a number of owners of large residences who have come to understand the compost method and who are now clamoring for the compost that he makes by the hurry-up process in connection with his mushroom production. The demand has for some time exceeded the supply. And incidentally, he has discovered several who are organic enthusiasts and emphasize organiculture as the one and only method.

Another example: Just recently my brother drew my attention to several clumps of weeds mingled with a few stalks of wheat which towered way above everything else growing there. He had dumped several loads of his compost in preparation for making a lawn and garden. The compost piles were proudly demonstrating what they could do toward stimulating plants to prodiguous growth. An apple tree which had been trampled down and almost killed was given compost and in about two weeks it was a modified example of a Jack's "Beanstalk."

My brother sent me a big load of compost about a month or more ago. I spread it 2 or 3 inches thick between every row and around every vegetable (tomatoes, cabbage, etc.), rose trees, fruit trees, etc. And now compliments are constantly coming in about my "wonderful garden". No cultivating, few or no weeds, but just sit and watch it grow.

Rev. Walter Firth,
1533 Lincoln Avenue,
Flint (3), Michigan.

—o—

COMPOST HASTENS GROWTH

July 18, 1947.

I certainly like your Organic Gardening Magazine. I made several batches of the fertilizer and find it wonderful. I live on a very rocky hillside, shale rock, so that every time you stick your fork down, up come more rocks. There are several pine trees in the plot of ground which is 100 by 195 feet and slopes south. It is quite steep where it has not been terraced. This year I moved the Chrysanthemums from the slope and planted them where the ground is level, and planted onions, beans, and okra on the slope. I used compost in every row and I have never seen such big leaves. Although I planted them early, the bean plants still have many pods on. Onions grew in this soil for the first time, usually they only develop small tops. This year with compost, however, they had some bottoms. The mustard and other greens grew so fast and developed such big leaves that it seems to me I threw the seed out one

night and ran out and gathered the produce the next morning. My friends can hardly believe that compost could make such a wonderful difference in my garden. But seeing is believing.

Mrs. M .M. Huchcock

—o—

COMPOST MAKES CLAY SOIL FERTILE

September 2, 1947.

I have a garden spot 60 by 90 feet which is utilized for gardening purposes. In 1942 the soil was practically solid clay so that I trenched the garden every three feet and filled the trenches with black sand and compost, and muck. My neighbors didn't think we would get much but we put them all to shame because we had the best crops they ever saw. I am breaking the clay in the garden by adding sand and rotted leaves composted with hen manure.

Herman R. Marwinske,
721 East Genesee,
Saginaw, Michigan.

—o—

RASPBERRIES PREFER COMPOST

Aug. 26, 1947.

Here is an item for your magazine which I consider a real endorsement of "Compost." I planted my purple raspberry bushes in May of this year using compost in the holes in which the plants were set. By the middle of August this year they measured nearly seven feet high and are branching out nicely.

Mrs. Lloyd Weber,
Cohocton, N. Y.

—o—

COMPOST-GROWN PLANTS RESEMBLE SEED CATALOG PICTURES

July 1, 1947.

I should like to report some results of experimental organic gardening in the highlands of northwestern Pennsylvania. The summers there are cool and short. The soil is mostly yellow clay. Our garden has never been fertilized with chemicals. Formerly, when we kept cows, we applied some manure each year. For a few years, I have made compost, using hay, chicken manure, and lime. We have always had fair crops in this garden, but I believe they improved when we started applying compost, even though we did not have very much of it.

We have had very few pests in this garden. We believe the flavor of the vegetables and root crops, especially potatoes and beets, to be superior to any purchased at the stores. Appearances of plants begin to compare with the illustrations in seed catalogs. Beets are very sweet and tender; carrots very good; string beans, I picked 22 pods from a plant at one time and there were green ones left; onions, we used to raise them 2 inches in diameter, but now we grow them 3 inches or larger.

The only failures I recall were potatoes which in some seasons are attacked by late blight. Perhaps if the soil had some more humus and compost, it would help prevent this. Also, last year, our gladioluses were ruined by thrips. The year before, the bulbs and flowers seemed so healthy that I decided not to put them in moth balls as the books recommend. Are thrips one pest that the organic method cannot overcome?

I really believe in organic farming and gardening. I am getting alarmed at the extent to which chemical fertilizers and poison sprays are being used to raise our food. I should like to see some statistics showing the extent to which our American food is being produced with the aid of chemical fertilizers. I believe a large percentage of our commercial vegetables and potatoes are produced this way.

Paul G. Johnson,
Box 81,
Belle Vernon, Pa.

A Principle for Maintaining Earthworms in Farm Soils

By HENRY HOPP and PAUL J. LINDER*

Soil Conservation Service, U. S. Department of Agriculture
Beltsville, Maryland

(Reprinted from SCIENCE, Vol. 105, No. 2739, June 27, 1947.)

EVER since the classic work of Darwin (2), evidence has been accumulating that earthworms have important physical and chemical effects on soils (1, 3, 5). This information has not been of much direct use in row-crop farming because practical measures have not been devised for maintaining earthworms on clean-tilled land. In recent studies (4) on a Maryland soil, the earthworm population was found to be much lower under annual clean-tilled crops than under sod crops. The reason for this difference has since been investigated, with the purpose of finding a practical means of avoiding the decline in earthworms on annually clean-tilled land.

The investigation was conducted on previously established agronomy plots at the Maryland Agricultural Experiment Station (4). Monthly, from February 1946 to January 1947, the earthworms in the plow layer were counted. Table 1 gives the results for plots cropped to corn annually with and without a winter cover and to a two-year rotation in which corn is followed by various legumes and grasses. In plots cropped to corn annually the earthworms increased during the growing season until early November. Between November 23 and December 7 a sudden cold period occurred, and most of the earthworms were killed at this time.

TABLE 1

EARTHWORM POPULATION BY SEASONS IN CONTINUOUS ROW-CROPPING AND IN TWO-YEAR ROTATIONS

Season	Earthworms (thousands per acre)		
		Two-year rotation	
	Corn annually	Sod in spring, corn in summer, wheat in fall	Wheat in spring, sod in summer and fall
Early spring	60	290	85
Late spring	140	290	80
Summer	125	300	75
Early fall	240	440	305
Late fall (after freeze)	85	85	335
Winter	80	60	320

During this cold period many of the earthworms in the rotation plots containing young wheat also died. In the rotation plots that contained a sod of wheat stubble plus legumes and grasses, the earthworms survived.

At a nearby weather station, a minimum air temperature of 8° F. was reached at this time. On land that was bare or contained young winter wheat, the soil froze to a depth of about 4 inches; but under the sod, and in other plots covered with straw mulch, no freezing occurred. When the plots were resampled between Decem-

*The collaboration of Homer T. Hopkins, formerly associated with this project, is acknowledged with pleasure. Aggregate analyses were made by Jay C. Bryant.

ber 4 and 10, numerous dead earthworms were found in those with frozen soil.

The response of earthworms to temperature was checked further in the laboratory. Earthworms from a sod field were placed in jars of soil having 40 per cent moisture content. The jars were kept at various temperatures in cold storage chambers. The earthworms did best at 36° F., as judged by changes in body weights, but died at 32° F. (Table 2). In a subsequent test in which earthworms from the various agronomy plots were subjected to a temperature of 32° F., all died, regardless of the plots from which they had been taken.

TABLE 2

CHANGE IN BODY WEIGHT ACCORDING TO SOIL TEMPERTURE

Soil temperature (Degrees F.)	Change in body weight (%)
32	minus 100
36	plus 3
40	minus 6
50	minus 15
55	minus 6
60	minus 22
70	minus 19
80	minus 58

These observations indicate that the death of earthworms on the clean-tilled land in the late fall was induced by the sudden drop in temperature to below 32° F. According to observations on three of the plots, this harmful effect can be alleviated by surface protection. These plots were almost bare except for small areas that had been protected with surface coverings of lespedeza hay, soybean residue, and burlap, respectively. The earthworms under the coverings withstood the cold and were highly active (Table 3).

TABLE 3

EFFECT OF SURFACE PROTECTION ON WINTER SURVIVAL OF EARTHWORMS (January 21, 1947)

1946 crop	Type of surface protection	Earthworms (thousands per acre)
Corn	None	0
	Burlap	995
Corn	None	0
	Lespedeza mulch	1,610
Soybeans	Light residue	335
	Heavy residue	665

Various practical ways of protecting the soil surface against sudden drops in temperature in the late fall may be suggested. Threshing residues, chopped corn stalks, composts, or manure might be spread early in the fall after the row crop has been removed. Where these materials are not available, a fast-growing catch crop that forms a winter mulch might be interseeded at the last cultivation of the row crop.

REFERENCES

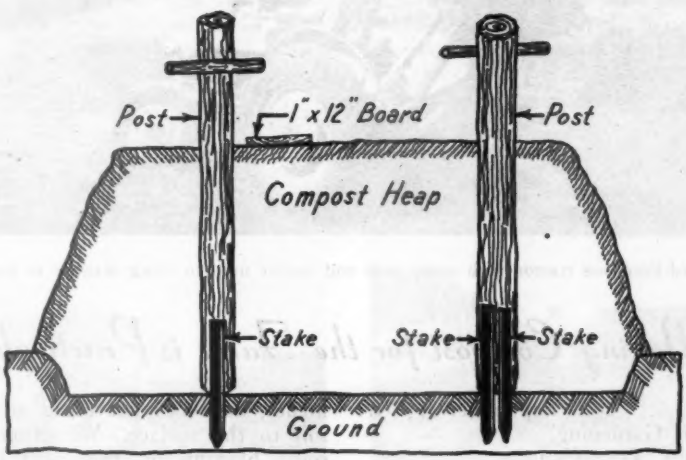
1. BYERS, H. G., KELLOG, CHARLES E., ANDERSON, M. S., and THORP, JAMES. In *U. S. D. A. Yearbook*, Washington, D. C.: Government Printing Office, 1938. Pp. 948-978.
2. DARWIN, CHARLES. *The formation of vegetable mould through the action of worms*, New York: Appleton, 1882.
3. HOPP, H., and HOPKINS, H. T. *J. Soil & Water Conserv.*, 1946, 1, 11.
4. HOPP, H., and HOPKINS, H. T. *J. Soil & Water Conserv.*, 1946, 1, 85.
5. LUNT, H. A., and JACOBSON, H. G. M. *Soil Sci.*, 1944, 58, 367.

Corn Salad

This delicious hardy vegetable can be sown in spring as soon as you can work the ground. You get needed greens before the first spinach.

A READER SUGGESTS

A METHOD FOR VENTILATING THE COMPOST HEAP



IT is absolutely essential that the compost heap be well ventilated so that there is a sufficient flow of gases between the atmosphere and the interior of the compost heap. The soil organisms which break down the plant and animal residues and convert them into compost are aerobes, i.e. they must have the oxygen from the atmosphere to carry on their life activities.

The drawing on this page illustrates a simple but efficient method of ventilating the compost heap. It is the suggestion of one of our Organic Gardening Magazine readers. As soon as the pits have been dug or the soil has otherwise been prepared for the compost heap, a number of ordinary fence posts are set up and held in position by driving three small stakes around the base of each post. The posts are placed where the ventilators are desired. By using chalk or heavy pencil, marks can be made on the posts 8 inches apart to serve as a guide in building the various layers of the heap: 6 inches for plant material, 2 inches for the fresh manure, a sprinkling of raw ground limestone, and a quarter inch or less of good earth. When the heap has been built to its usual height of 5 feet, the posts are pulled out to form the ventilating chimneys. To facilitate the removal of the posts, a board can be laid on the heap to serve as a walk, and a cross piece nailed near the top of the post to serve as a handle to pull out the post. The size of the ventilator is determined by the size of the post used.

Ford-Ferguson tractor with small rear end loader used to bring manure to heap.

Making Compost for the Farm is Practicable

September 5, 1947.

Organic Gardening,
Emmaus, Pennsylvania.

Gentlemen:

I am enclosing some snapshots of compost making on our farm near Beresford, North Dakota.

Inasmuch as our prevailing summer winds are from the south, south-east, we used some discarded steel roofing to build a windbreak on the south, east, and west. The heaps are made about 6 feet wide, 5 feet high, and 30 feet long. We use six 6-inch ventilators which are held in place, as shown in one of the photographs, by wire fastened to fence and steel post at the other end.

This is our second year of compost making. Last year we made enough compost to cover about 10 acres, and the result is very apparent in the corn crop now nearing maturity.

The field in which the corn is now growing was plowed last fall and in the spring we went over it with a Ferguson tiller. This machine is equipped with a tine that penetrates the ground to a depth of 9 to 11 inches, but does not bring any subsoil to the surface. We experienced some blowing on this field in the spring despite repeated cultivations across the fields at intervals of a few rods. This was before the corn was planted. After planting came an unusually wet May and June followed by the driest July and August on record. Despite this severe drought, broken only by two or three light, local showers, we anticipate a yield of 50 to 60 bushels of corn per acre on this piece of ground. Corn in adjoining fields is badly fired and will not yield more than 10 or 15 bushels of nubbins.

Yours very truly,
Almer O. Steensland,
Mayor of City of Beresford.

EDITOR'S NOTE—Many progressive farmers and horticulturists are finding that it is practicable to make compost on a farm and orchard scale. It is anticipated that organic farming will become generally adopted as labor-saving devices for making compost are introduced.

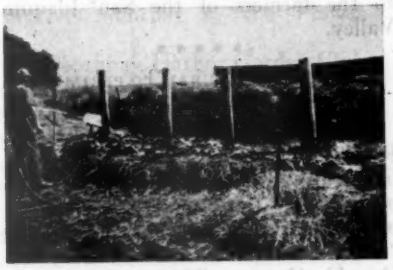
Ventilators wired in position on first layer of heap.

Wetting down the compost heap with hose fitted with spray nozzle.

Ready to dump a scoop of manure on heap with the tractor attachment.

The heap progresses with another layer of compostable materials.

First layer followed by film of lime and earth.



Proper moisture content is absolutely essential to making good compost.

On The Organic Front

By DR. WILLIAM H. EYSTER

Mrs. Franklin Delano Roosevelt as an Organic Farmer

According to the New York Times, Sunday, August 31, 1947 the late President Roosevelt's son, Elliott and his mother incorporated as Val-Kill Farms (Val-Kill means valley stream) the lands of the late president, exclusive of the 33 acres surrounding the "big house" and library which belong to the Government. Upon being interviewed Mrs. Roosevelt remarked with a smile, "I'm only the minor partner." It is reported that she and Elliott have been reading such books as Louis Bromfield's *Pleasant Valley* and the *Organic Gardening Magazine* in preparation for the undertaking.

* * * * *

Winery Wastes will be Made into Fertilizer

Tests conducted to eliminate winery waste odors may result in the development of a new industry in California. Recently an application to the Fresno County Planning Commission was made for the organization of the ORGANIC FERTILIZER COMPANY at Malaga. This company plans to convert the organic wastes into an organic fertilizer which will be shipped to the farmers of the San Joaquin Valley.

* * * * *

Ohio Agricultural Experiment Station Endorses Composting

In the July-August Farm and Home Research, a bimonthly bulletin published by the Ohio Agricultural Experiment Station, Wooster, Ohio appears an interesting article entitled "Organic Matter for the Garden," by Donald Comin. This article takes note of the increasing interest in organic farming and gardening with special emphasis on the value of plant and animal residues, sources of soil organic matter, the Indore method of making compost devised by Sir Albert Howard and adapted to this country by J. I. Rodale, as well as some questions regarding the use of chemicals.

* * * * *

On the Atlantic Bookshelf

Occupying a conspicuous place on the Garden List of the Atlantic Bookshelf are two books concerned with the organic method. The following are direct quotations from the April, 1947 number of the Atlantic Monthly: "The best news is that the British author of one of the great books of our time, *An Agricultural Testament*, has written a fine explanation of the relationship of soil and food values: THE SOIL AND HEALTH; A STUDY OF ORGANIC AGRICULTURE, by Sir Albert Howard (Devin-Adair, $4.00). His life work, as experimentalist and farmer, has proved his points. His methods are used on millions of acres in Ceylon, India, South Africa, Central America. They can also be used in back-yard gardening.

"Following the same basic principles, *but of more practical value to the gardener*, is PAY DIRT; FARMING AND GARDENING WITH COMPOSTS, by J. I. Rodale (Devin-Adair, $3.00). This was one of the first books to prove that a fertile soil (one developed by vegetable and animal wastes and not by chemical fertilizers) is the foundation of healthy crops and healthy human beings. It is theoretical as well as practical. The small garden, as well as the farm, can be developed on these principles."

Readers of the Organic Gardening Magazine will be delighted to know of the recognition that is being given

to the above two books which point out the fundamental importance of composts in relation to soil conservation, successful farming and gardening, and the health of plants and man.

* * * * *

President William H. Dinkins, a graduate of Brown University and president of Selma University, Selma, Alabama visited our Organic Gardens and Farms, and made the following report of his visit which appeared in the July issue of The Selma University Chronicle:

"At Emmaus: Mr. Rodale was absent in New York, but I saw Dr. Eyster, his botanist and helper on his periodical and book publications. After some discussion of organic fertilizers, Dr. Eyster called for the young son of Mr. Rodale, who took us about three miles away to the Rodale farm where I could see the results of the organic practices in agriculture. I could not but wonder and consider what would be the effect in the United States if our farmers would make their own fertilizer, not simply by putting manure on the field, but by making compost from the manure with the addition of three parts vegetable matter for one part of stable manure. I saw the effect of rock mulches around trees and in the vegetable garden. I saw compost heaps in various stages of completion. I looked in the greenhouse, in the henhouses where organic methods are in use. I saw the earthworm hatcheries, to supply earthworms to the compost piles. I came away with a determination to make known to my public the need of using natural fertilizers, which do not burn up the crops, but which cause permanent improvement in the soil; and health in soil and man."

* * * * *

A Ribbon for a Composting Exhibit

Organic Gardening,
Emmaus, Pennsylvania.

I thought the editors and readers of "Organic Gardening" would be interested to hear about an excellent exhibition of your method of making compost which was done by Mr. and Mrs. Wentworth Shackleton as the main feature of the recent Flower Show in Boothbay Harbor, Maine. Because of its merit as an outstanding exhibit, the Shackletons were awarded a Tricolor Ribbon by the three enthusiastic judges.

The exhibit consisted of a cross section of the layered compost heap done for convenience in one of the new aluminum tube frames, showing the order of the layers, proper depth of each, and the materials used. In addition, there was a section under glass in a small box with a descriptive label opposite each layer. There were some bright colored flowering plants, a small weathered barrel bulging with thrifty strawberry plants growing from holes in its side, and a garden hose with a few garden tools. *In a conspicuous place at the front of the platform were piles of your little pamphlets,* a copy of which left the hall with nearly every guest.

As the guests crowded eagerly around the platform studying every detail of the display, I heard many exclaim that now they understood what it meant to make a compost heap. They had a definite idea of how to go about it. Just reading about something is often not enough. Most people have to see a thing to understand it. I am sure that the Shackeltons' exhibit was enlightening to many as well as being an artistic and decorative addition to the Flower Show.

The Boothbay Harbor Garden Club is fortunate to have among its members people like the Shackeltons, who are so willing to contribute their time and effort to put before the public something as worth-while and vital to its welfare. They themselves have long been enthusiastic supporters of the Organic Method of Gardening.

Harriet H. Lutnicki,
65 Gleason Road,
Lexington, Mass.

Garden Calendar—November

During November Mother Nature is busily engaged tucking Her herbs, shrubs, and trees in for the winter. All but the late-summer blooming herbs have already withdrawn to underground retreats. Most of the shrubs and trees have dropped their leaves after a season of brilliant autumnal colors, one of Nature's greatest exhibitions in the northern states. The buds of the shrubs and trees are well protected against low temperatures and the loss of water by cutin, waxes, and epidermal hairs which often give to the buds a woolly appearance. Their stems and branches are protected from excessive water loss by an impervious layer of cork in the bark. The cone-bearing trees and the broad-leaved evergreens retain their leaves during winter but they are well protected by a thick cutin against water loss. The leaves also contain such substances as pentosans which serve as antifreezes during the winter months.

THE NORTH

Flower Garden:—November is widely recommended for the planting of woody perennials, including roses, for the climatic area that extends southward from the latitude of New York and Kansas City. For roses the soil should be prepared to a depth of 18 inches and have mixed in it liberal amounts of compost and bonemeal. Prepare your trench for sweet peas by a heavy application of compost and bonemeal at the rate of one pound for each fifteen feet of trench. They may be planted now or in early spring. Climbing roses, especially the tender varieties, should be protected by laying them on the ground and covering them with mulch or even burying them a few inches underground. Finish planting tulips, lilies, and other bulbous plants.

Collect all dead stems, dead leaves, and other plant material from around peonies and chrysanthemums and put them on the compost heap. Such sanitary measures go a long way toward controlling diseases. After the ground is frozen, mulch the perennial bed to prevent or reduce to a minimum freezing and thawing. A suitable mulch would be a coating of compost and on top of that a layer of leaves several inches thick.

Berries:—The strawberries, raspberries, blackberries, currants, and gooseberries should be given a liberal dressing of compost that has been made without lime, as these plants prefer slightly acid soils. As soon as the ground has frozen, the strawberries in particular should be covered with a mulch of leaves or straw. Avoid weeds as mulch because of their seeds.

Vegetables:—Clean up all refuse from the vegetable garden, as dead plants, and put them in the compost heap. For an early spring garden, loosen the soil and work into the surface layer enough compost to make the soil appear quite dark. Celery and such root crops as beets, turnips, carrots, and rutabagas

should be stored for the winter. Spinach, kale, mustard, parsnips, and carrots can stay in the garden for early spring use.

Shrubs and Trees:—It is not too late to plant deciduous shrubs and trees. Water the evergreens and give them a mulch of leaves several inches thick. Remove all suckers from the lilac bushes and give them a liberal dressing of compost. This is a good time to make cuttings of evergreens, shrubs, and trees. Tie the cuttings in bundles and bury them in moist sand and keep them in a coldframe or cellar during the winter. Root formation in cuttings can be greatly accelerated by using some root-forming hormone as Rootone.

Lawns: —The lawn should go into the winter with not more than two inches of topgrowth.

THE WEST COAST

Fallen leaves and all garden wastes should be collected and placed in the compost heap.

Crepemyrtle can still be planted in southern California as well as in the warmer interior regions.

Flower Garden:—The bulb beds should be planted with *Primula malacoides* and seeded with forget-me-nots. For early spring blooms, plant snowflakes *Leucojum vernum*). Others are Blue African Lily, Amaryllis, and Tigridia.

Vegetable Garden:—There still is time to sow vegetables for early spring use.

Roses:—Roses may be pruned anytime between November and February. November is the best month for planting roses in the Pacific Northwest.

Evergreens:—Evergreens, both cone-bearing and broad-leaved, may be planted during November and December.

THE SOUTH

Flower Garden:—This is an excellent time for a Chrysanthemum Show, as these magnificient flowers bring the flowering season to a close. The bulbs of spring blooming plants may be planted. In the deep South, plant Easter Lilies, Callas, Amaryllis, and Hemerocallis or Day Lily. Late in the month sow Sweet Peas in furrows about eight inches deep which contain a generous application of compost worked into the soil. Cover the seeds with about four inches of soil.

Lawn:—If the winter lawn was not planted as suggested in the Calendar for October, it should be planted early in November or it will be too late.

Roses:—The best season for transplanting roses is from late November to the end of February.

Shrubs:—All shrubs may be pruned and transplanted during the dormant period which usually lasts through February. It is during this period that Christmas holly (*Ilex opaca*) can be handled most successfully. Fruit and shade trees may also be pruned and transplanted at this time.

Fruits:—This is a good time to plant strawberries, raspberries, blackberries, and all other small fruits.

Vegetables:—The hardiest cool season vegetables may be planted this month for late winter and early spring use. Lettuce and radishes should be planted in hotbeds and cold-frames for winter use. This is the season to cut off the tops of old asparagus plants and put them into the compost heap and apply a generous dressing of compost to the asparagus bed. Plant asparagus, rhubarb, and cabbage.

Bodger Seeds Ltd.

Queen of the Market Asters grown with dividers of Harmony Marigolds for seeds

Asters

By G. L. Wittrock, Custodian of the Herbarium

New York Botanical Garden

ONE of the common, easily grown garden favorites is the annual Aster with its many bazaar colors, forms, textures and blends. Were we told, however, that these annuals are not Asters at all we should be much annoyed. In spite of scientific accuracy, these flowers would still remain as Asters to us. Our spirit of curiosity may have become aroused to ask that if these flowers are not Asters, then what are they? Before we discuss how to grow them and the precautions necessary to protect them against the few major diseases to which they are susceptible, let us unravel this confusion in names and learn about the origin and history of our garden Asters. The name Aster is a loose, confusing term applied to a number of flowering groups. The name originated from a Greek word meaning a star and was applied to flowers that have their rays radiate from a common center giving the effect of a many-pointed star. Many flowers have this radiating character but the Greeks applied the name to the true asters and sometimes called them Starworts; these plants are perennials and will be discussed later.

We often hear of "Yellow or Gold-

en Asters", these also are not true Asters, since no yellow Asters are recognized nor have any been developed to date. But these yellow flower heads do have radiating rays suggestive of stars and do resemble our garden Asters; these are usually flowers of Chrysopsis.

Annual "Asters"

Our common Aster, however, is an annual which the early Greeks did not know because it was not introduced into Europe until 1731. Linnaeus originally named this annual species *Aster chinensis*, but later botanists observed that it was distinctive and certainly different from true Asters. This annual species was then named *Callistephus chinensis* proposed in 1832. The genus name Callistephus, is also a Greek word meaning a beautiful crown, because of the pappus crown or silky hairs on the seeds. Even though this garden flower is clothed with confusion and apparently it has an oriental background we are reluctant to call it anything else but Aster.

The origin of this annual Aster which often is sold as *Callistemma* is from China, where it is known as "Ching Hsi La". The species with small flowers is still found growing wild in the province of Hopei and other parts of northern China, though it apparently has long been in cultivation in that country in many colors since seeds were sent in 1728 to France by the Jesuit missionary R. P. d'Incarville according to some records. There is some doubt about this since Chinese records show that this famous missionary did not arrive in China until 1740. However, seeds sent by some missionary in China were received and grown in the Royal Gardens in Paris. These newly introduced plants were named "Reine Marguerite", a name still applied to these annuals in France. The official date of introduction, 1731, is credited to Philip Miller, a horticultural botanist, who reported receiving seeds from France and growing them in Chelsea, England. The first group of seeds that he received germinated and developed into single red and white flowers. In 1736 Miller received more seeds and these developed into single blue flowers. Finally in 1752 more seeds were received and these bloomed into double flowers of red and blue; and the following year seeds of double flowering white plants were received. Miller described the plants as 1½ to 2 feet tall, indicating that the dwarf forms were not yet know. By 1806 variegated blue and white varieties appeared and were offered to the public in Philadelphia by the nurseryman M'Mahon as desirable garden annuals. By 1837 New York learned about China and German Asters, as they were then known from listings in the catalog of Bridgeman, a seedman. The introduction of German Asters, where known as "Sommer-asters" indicated that the first advances in multiple forms and colors originated in that country and by 1845 German Asters became most popular throughout the New England states. During this period the quilled

Aster, *American Beauty* Burpee

forms appeared in which the flat floral rays were rolled or tubular suggestive of a quill. This new type, developed by German florists, became very popular and were offered in solid colors of white, rose, deep red, blue and purple, mottled, striped or edged with these colors, and some with either red or blue centers. By 1880 the habit of the plants tended to change and gave rise to our modern dwarf forms. Since that time China Asters have been developed into various distinctive types and races. Each type is characterized with the full complement of colors. Some horticulturalists divided these types into over 17 sections but these overlap so much that the classification is not practical. In general one can recognize 2 major groups: flat rayed and the quilled. These are divided into subgroups as follows:

1. Simple or flat-rayed types. These types retain the ancestral traits of *Callistephus chinense* which originally had 1 to 2 rows of flat rays surrounding the central disc flowers. Modern flat-rayed forms, known as the "Comet" type, have 5 to 6 more rows of ray flowers. This flat ray type may be found in 2 forms:
   A. Incurved type. In this type the flat rays curve inward toward the center giving a ball-shaped flower.
   B. Reflexed type. The flat rays of this type are reflexed or spreading outward.
2. Quilled types. In this form nearly all of the rays are tubular in structure and the subforms are:
   A. The German Quill which is characterized by the inner florets being short and quilled while the outer rays are flat and elongated and sometimes quilled.
   B. The needle type which has all the rays quilled, approximately of the same length.

The growth habit of the forms are also classified by growers as "Upright": in which the branches are erect and the plants compact; "Semi-upright"; representing plants that have few but strong branches ascending from the base and no lateral branches; "Branching": a class of plants with many branches giving a pyramidal effect; and "Spreading": a class in which the plants are more open and have a spreading habit.

The many named varieties and forms in existence today have not been sufficiently standardized to assure an accurate and serviceable list. In 1895 various American seed catalogs offered over 250 named varieties. Some of the named varieties are still listed today or are referred to in comparison with new introductions of colors, types, and forms. Early flowering Asters are generally and comparatively dwarf, varying from 12 to 18 inches high. Midsummer varieties are taller ranging to 2 feet. Late flowering varieties reach a height of 3 to 5 feet. Standard forms obtainable today are described as types and the following list is suggestive:

1. Early blooming types:
"Royal": an early flowering type, the plant being much branched and tending toward single flowers of the Comet type. Many colors are available.
"Queen of the Market": an excellent type for early flowering. Sow the seed the end of March either in protected cold frames or in flats in the home; a very graceful type with an open or spreading habit and excellent for cut flowers. It is the first of the early types to have been developed.
"Early Branching": another excellent dwarf type for early planting with a range of colors.

2. Mid-season flowering types:
"Crego": a mid-season plant, 2 feet high with reflexed and twisted rays.
"Comet": an old standard with the plants 2 feet high with many rows of ray flowers in many colors.
"King": plants 2 feet high with quilled and incurved rays. This standard is suggested as the best if only one seasonal type is to be grown. It is very distinctive and obtainable in a conspicuous range of attractive colors.

"Astermum": a mid-season plant 2 feet tall with flowers resembling a small chrysanthemum head.
"Peony-flowered" or *"Truffant"*: plants 2 to 3 feet high with large double flowers, some of the flowers measuring almost 4½ inches across.
"Ostrich Plume": a most unusual and attractive plant with flowers often 6 inches across.
"California Sunshine", *"Giants of California"*, *"American Beauty"* and *"Victoria Needle"*: all excellent mid-summer bloomers and seeds can be sown out doors in May.

3. Late blooming or fall flowering types; these types can be sown as late as June with success:
"Beauty": plants are from 2 to 5 feet tall, having long-stemmed flowers, blooming late in the fall. This is a Comet type with incurved rays.
"Giant Branching" or *"American Branching"*: plants are 2½ to 3 feet tall, blooming late; the floral rays are loosely incurved; excellent for outdoor sowing.

One should buy seeds of selected varieties based on the form and period of blooms; by doing this one can have a series of flowers from early July to frost. At the Annual Flower Show in New York City last March many attractive varieties of seeds were offered, based primarily on color and form rather than on varietal names.

The culture of annual Asters is not too difficult though they should be treated as tender annuals; they transplant most readily and easily. The early forms should be started indoors in March and April, planted in flats and placed before a good sunny window, but do not water too often; permit the immediate surface of the soil to dry a bit between watering to prevent the seedlings from damping off. When the seedlings have developed 2 to 3 sets of leaves transplant them into pots or directly into beds if there is no danger of frost. A hot-bed is of course ideal for early blooming varieties, and even cold frames are possible, but the aim for early-blooming varieties is to have plants ready for the outdoor planting in May. The seeds of later blooming varieties can be planted outdoors in rows selecting mid-summer and late-blooming varieties.

In preparing the seed bed it is well to work compost or leaf mold compost, making drills 2 to 3 inches apart and ¼ of an inch deep; seeds are then sown 6 to 8 to the inch usually in mid-May. The drills are covered lightly with half sifted soil and half sand so the surface will not become hard. Some suggest covering this with a light straw, hay, or burlap, this retains moisture. Remove the covering immediately after the seeds germinate. Transplant the seedlings when they have developed their first true leaves. The permanent bed should be well prepared and enriched with rotted manure or a good compost or peat-moss mixed with dried cow or sheep manure; the ratio is 6 lbs. of manure to 1 bushel of compost or peat-moss. Soak the soil well in the newly prepared bed for at least a few hours before the lifted seedlings are transplanted, keeping the young plants wet to prevent drying out. Set the plants 9 to 12 inches apart in rows 18 inches apart if the plants are desired for cut flowers, otherwise allow at least 1 foot per plant, particularly for large varieties. Some suggest planting a few seeds every 12 to 18 inches in the permanent bed and when the seeds have germinated select the strongest plants and pull out the rest; this eliminates the dangers of transplanting, but one must have plenty of garden space to do this. I usually plant my asters among the early spring flowers to eventually replace the latter. The spring plants serve as a protection while the young Aster plants are developing.

Annual Asters grow well in any good, well drained garden soil that is well exposed to sunlight; Asters are sun plants and cannot tolerate too much shade. They should also be well watered if the season is dry. Soils

must be seriously considered in planting Asters. There are definite rules to follow that are practical and helpful in preventing many diseases common to Asters.

Rule I: Never plant Asters in the same garden spot or bed year after year; alternate.

Rule II: Buy good wilt and disease resisting seeds each season; Asters will reseed but it is best to start always with new seed each season.

Some of the common diseases associated with the annual Asters are the following:

1. Aster yellows: this is a serious virus disease. Plants infected with it become stunted and develop spindly, yellow shoots and greenish-white, distorted flowers. The leaves lose their chlorophyll and turn yellow. This disease is not local but occurs throughout the United States. Infection is caused by the Six-spotted Leafhopper, an insect that carries the virus from diseased to healthy plants. Sometimes the common aphid is also the carrier. To control the disease, remove all diseased plants immediately and burn them; check the Leafhoppers with a contact insecticide. Some commerical growers cover the plants with cheesecloth to prevent the insects contacting the plants. This method is very satisfactory.

2. Aster wilt: this disease may appear in the early growth stages of seedlings or later in older and well developed plants. China Asters are very susceptible to this disease. The wilt organism is thought to be a Fusarium, a low form of fungus growth which lives normally in the soil. It penetrates and grows into the roots of a plant and attacks the vascular or water conducting tissue of the plant. Young plants may be effected early but the effects are not often detected until the plants are older. When the plant is 7 to 8 inches tall and infected it assumes a brown, rusty color, or dies immediately. Infections often take place at transplanting time, the leaves dry up and the plant dies. It is not known how long the Fusarium fungus will live in the soil but it is believed to survive several years. Wilt-resisting varieties should always be planted, but if the soil is badly infested even these plants will die. Some suggest soil sterilization of the seed bed with formaldehyde. This method, however, is a drastic procedure since it will destroy all organic life particularly earthworms that are helpful to good soil fertility and is not recommended. The wisest procedure is not to plant the Asters in seriously infected soil for at least a few seasons. These beds may be suitable for other plants not subject to this disease.

3. Aster or orange rust: this is a fungus disease detected by the development of minute orange-colored spots or pustules on the underside of the leaf. This may be prevented by growing the plants in full sunlight with plenty of compost and wood ashes in the soil.

4. Root lice: this is a species of aphid carried and controlled by ants. These aphids are pastured on the root system of various plants and suck out the juices of the plants, checking and dwarfing their growth, and sometimes even killing them. When the plants are suspected of having the parasite a two inch layer of compost should be cultivated into the soil; the compost serves as a balanced fertilizer. It is always wise to use compost and plenty of moisture when plants are transplanted; this discourages ants from bringing in the root aphids.

5. Aster beetle: there are several species of the blister beetles that feed on the flowers of China Asters. Hand picking and dropping the insects into a container of naphthalene or kerosene is one method of control. Another is to cover the plants with cheese-cloth.

6. Tarnish plant bug: this is a small, light and dark brown sucking insect. It is very difficult to control. Hand picking from garden plants is advised.

7. Stem borers: these pests are con-

trolled by cutting them out of the plant immediately when observed and often the plant can be saved. Keeping down weeds, particularly those of the Sunflower family, is a wise precaution.

Hardy Asters

The true Asters known as Hardy or Perennial Asters have been the source of many delightful garden plants, particularly in Europe. These are the "Starworts" of the classics. There are over 500 species native to America, Asia, Africa, and Europe; of these, 121 species and 15 varieties are listed as the source of horticultural plants. These forms are used for perennial borders, roadsides, gardens in general, mass plantings, and for cut flowers. There are now listed over 750 horticultural forms of these perennials, 71 being distinct hybrids. Propagation is by clump division, cuttings, and by seeds.

The most conspicuous of this group are "Michaelmas Daisies", a name applied to highly developed forms particularly of 2 native American species, Aster novi-belgii the "New York Aster" with 174 named forms, and Aster novae-angliae, the "New England Aster" of which 40 forms are now listed. These native species have been highly cultivated, selected, and developed, particularly in England. The name "Michaelmas Daisy" is appiled to all of the forms since the plants bloom late in fall and are at their height at the time of the feast of St. Michael, the archangel, celebrated on September 29th.

The horticultural forms of the perennial Asters have flowers that range from white to pale lavender, deep purple, and shades of red. Many of the flowers are from 1 to 3 inches in diameter borne on plants from dwarf size to 6 feet tall. If the plants grow too tall and are desired shorter, pinch them back in early spring; this will help keep them small and bushy.

Plants are normally set out in the fall covered with a light mulch of straw, hay or dry leaves over the winter. This mulch should be removed early in spring before growth starts. This type of winter protection is wise for established plants too. They grow best in deep, moist, rich soil, though some varieties have been developed that can actually survive well in impoverished soil and under exposed conditions. For good growth it is best to divide the clumps annually. It is surprising that the horticultural farms obtained from our American species do not grow well under American cuture, though our wild parent species are easily transplanted into our gardens and thrive in fairly wet locations. The improved forms planted in America are subject to mildew and also to the Aster wilt. The mildew attack can be controlled by planting in places having full sunlight. The wilt disease can often be overcome by propagating the perennial with short cuttings in the fall after the blooming period, and rotating the plantings.

If the plants are grown from seed, it is best to sow in a greenhouse in March, in a cold frame in April, or outdoors in May. The best time to plant out hardy Asters is in late fall protected as suggested by a winter mulch, or to plant in the spring before the plants are more than 1 or 2 inches tall, never during the summer months.

It is indeed unfortunate that these hardy Asters are not better known in America. There are many possible, attractive uses for them in our gardens. The early blooming alpine Asters are very little known in America though they are valuable for rock gardens, borders, and mass plantings. Many of our native species are still transplanted into our gardens, but there should be more interest in them, because of their unique beauty. There are too many of our native American species neglected that have true horticultural appeal. Undoubtedly, the exotic, foreign, and new introductions from some remote region appeals more readily than our beautiful local native species, particularly the hardy Asters that abound in our open fields and woods.

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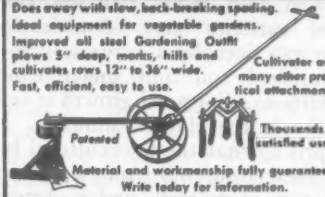

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Palmquist, Edward M. and Petry, Loren E., GENERAL BOTANY LABORATORY BOOK. (W. B. Saunders, Philadelphia. $2.25).

This laboratory manual covers the usual plant material used in a course in General Botany, but the subject matter is presented in a fresh and stimulating manner with key drawings, clear-cut procedures, and thought-provoking questions which will go a long way toward insuring the complete participation in the laboratory on the part of all the students and the close correlation of the laboratory studies with the discussions and demonstrations in the lecture room.

Jack, Walter Thomas, THE FURROW AND US. (Dorrance and Company, Inc., Philadelphia. $2.00).

This book is written as an answer to Faulkner's *Plowman's Folly*. It deals with the origin and nature of soils and soil fertility. The author discredits chemical fertilizers but believes that the plow is essential to successful husbandry. Corns now used seem to yield better in plowed soil than in disked soil due no doubt to the fact that they have been selected from plowed-field corns and perhaps also to the fact that a piece of equipment is needed which will more completely mix the organic matter in the surface layers of the soil than can be accomplished with the disc. The author appreciates the importance of humus and other soil constituents to soil fertility and to the nutrition of plants.

Bennett, Hugh Hammond, ELEMENTS OF SOIL CONSERVATION. (McGraw-Hill Book Company, Inc., 1947. $3.20).

The author treats in a very able manner the problems concerned with the erosion of our soils and clearly presents the basic facts that all citizens of this land need to know. The forces, rates, and effects of erosion are explained in clear, simple language. The conservation of soil in relation to agriculture, wild life, forestry, and flood control is ably treated. This book should be read by everybody.

WEED NO MORE

Q. I want to eliminate a large number of weeds from my lawn, and hesitate to use "Weed no more" since I believe it would be harmful to the earthworms. I would appreciate your suggestions.

L. J. W., Schenectady, N. Y.

A. More and more chemicals are being introduced as weed killers. The sad part of the use of chemicals to kill weeds is that an increasing number of well meaning but thoughtless people are using them. Chemicals which kill weeds are almost as sure to kill the beneficial soil organisms, some of which are injured by dilutions as great as one part of chemical to 100,000 parts of water. The poor earthworm certainly takes a beating all along the line. But the earthworm is not alone in this abuse because fertile soil is inhabited by billions of bacteria, actinomycetes, yeasts, fungi, and a great variety of animals.

—o—

ORGANIC FARMING IN DRY CLIMATES

Q. All the books my husband and I have read pertain to Eastern farming and gardening. We wonder how practicable the organic method is in regions where all the rain falls in winter and there is a prolonged dry season in summer.

Mrs. A. O. B., Cornell, California

A. In regions having abundant winter rains and long dry summers it is absolutely essential to maintain the soil in such physical condition that it will absorb all or most of the rainfall and hold the water in reserve so that

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it is readily available to the plants during the rainless growing season. The finer the soil particles, the greater is the soil's water-holding capacity. Of course, there is very little we can do to change the size of the rock particles in the soil. However, we can greatly increase the soil's water-holding capacity by increasing the organic level of the soil. Compost is capable of holding from 9 to 25 times its volume of water as compared to clay particles which can hold only about one-half its volume of water. Soil rich in compost can hold from 2 to 3 times its volume of water. It is easy to see that the easiest and most practicable way to increase the water content of the soil is to use plenty of compost. By sufficiently increasing the organic matter in the soil, the latter will absorb enough water during the rainy season to supply the growing plants during the dry summer.

—o—

COMPOST BOXES

Q. What materials should be used in making the container of the compost heap? Should it not be a concrete box of some sort to prevent the strength of the compost from seeping into the ground on which the compost heap is made?

Miss A. P. B., Richmond, Calif.

A. Almost any material may be used for enclosing the compost heap. A pit may be dug into the ground and the sides lined with bricks, cement blocks, cement, boards, or anything to prevent them from caving in. Or the compost heap may be made on top the ground. Enclosures for such heaps may be made of boards (not painted or treated with creosote or other wood preservatives), 2" x 4" or larger frame lumber fastened at the corners by an iron bar through holes in the ends of the lumber as in the Lehigh box, prefabricated slat sides which are then bolted together forming a box as in the Willow Grove box, or aluminum bars fastened together at the corners

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Of Organic Gardening published monthly at Emmaus, Pennsylvania for October 1st, 1947.
State of Pennsylvania
County of Lehigh

Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. I. Rodale, who having been duly sworn according to law, deposes and says that he is the Publisher of the Organic Gardening, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily, weekly, semi-weekly, or tri-weekly newspaper, the circulation), etc. of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations), printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:
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2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member must be given.)

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J. I. RODALE, PUBLISHER
Sworn to and subscribed before me this 8th day of September, 1947.
Elmer A. Barto, Notary Public.

as in the All-aluminum New Era Composter. Any other materials, as chicken wire, iron stakes, wooden stakes, or anything that will hold the materials of the compost heap in position can be used satisfactorily. Nothing in the compost heap need be expensive, but the product, compost, is the best fertilizer that can be applied to the soil.

—o—

ORGANICULTURE IN ALKALI SOILS

Q. We have a big problem down here in Texas. First, we do not get enough rainfall and therefore our trees and vegetables depend upon irrigation for water. The water from the Rio Grande, which we use, is very alkaline—it leaves a white deposit on the soil. Second, the drainage is so poor that after years of irrigation, the water table and salt content are very high. Two years ago when I bought my orchard, there was no salt to speak of but now several rows of trees next to the irrigating ditch are affected by the salt. Third, there are no earthworms in the valley soil. I purchased a box of earthworms from one of your advertisers last year but they did not last long. However, if I had known then about the compost pile, I probably would still have the worms. Are these worms really necessary for the soil as the humus would be? Fourth, here in the Valley we are adding ground sulphur to the soil to counteract the alkalinity. Could this be sprinkled into the compost instead of lime, or would the acidity of the compost made from grass, weeds, and

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goat manure be sufficient to overcome this alkalinity?

F. J. J., Mission, Texas

A. The first thing that you should do is to increase the organic matter in your soil to such an extent that all of the rainfall will be absorbed and held in reserve for the plants during the dry season. See Organic Farming in Dry Climates above.

The removal of the alkalies from the soil is very simple. Add sufficient gypsum to convert the sodium clays into calcium clays which are soluble in water. Then with water, wash out the soluble calcium clays and add organic matter. As the organic level of the soil increases, the need for irrigation will decrease. Many alkaline soils reclaimed in this manner are unusually fertile and remain so if properly farmed.

Gypsum is not recommended as a fertilizer or as a source of calcium, but solely for the purpose of converting the insoluble calcium clays to soluble calcium clays which can then be washed out of the soils in the reclamation of alkaline lands.

—o—

MOISTURE PROBLEM

Q. Recently I purchased a farm which has a heavy red topsoil and a very heavy yellow clay subsoil, so heavy that if you sink a pick in the wet soil you have a hard time getting it out again. Do you think that composting will make this soil so that it can be worked early in the spring for crops like peas and onions?

H. B. R., Norristown, Pa.

A. Quite clearly your soil is out of balance so far as moisture is concerned. Compost alone is quite effective in producing a better moisture balance, overcoming both dry and wet seasons. There is a limit, however, to what organic matter can absorb. The indirect effects of humus in the soil are equally important as it encourages an increasing population of earthworms. In general the earthworm population increases with the amount of organic matter in the soil. The tunnels of the earthworms will open channels which will conduct the water into the subsoil where it will be available to the plants during the warmer and drier months of the summer. The soil thus will be made porous so that conditions will be favorable for the soil microorganisms which are so essential to high fertility. By following the methods of organic farming faithfully and persistently, you will be fully rewarded by disease-free and health-giving vegetables and fruits.

—o—

SEED-GROWN POTATOES

Q. I have a belief, and I do not know where I picked it up, that a new potato grown from the seed ball is unfit for

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use the first year. The small potatoes fed to hens seemed to produce no ill effects. What is known about this matter?

A. R. K., Chazy, N. Y.

A. While potato seedballs are poisonous, the tubers that are grown from seed are as useful as the tubers grown from other tubers. The hen-feeding test is not sound, since birds are immune to many poisons that would destroy a man; but in this case there is no need for concern.

—o—

HUMAN EXCREMENT IN COMPOST

Q. How do you think it is possible to safely use human excrement for fertilizer purposes?

L. G., Minneapolis, Minn.

A. In countries where there is no system of water-borne sewage there has been no difficulty in converting the wastes of the population into humus. Trials of the Indore Process for converting night soil into humus were carried out in central India in 1933 by Messrs. Jackson and Wad. These trials and subsequent experiment by others were summed up in a paper read to the Health Congress of the Royal Sanitary Institute held at Portsmouth, England in 1938. It has been found that human wastes are even a better activator in the compost heap than animal dungs. All that is necessary is to provide for abundant aeration in the early stages and to see that the night soil is spread in a thin film over the plant materials in the heap and that no pockets or definite layers are left. Both of these interfere with aeration, produce disagreeable odors, and attract flies. If the compost heap is properly made there will be neither odors nor flies. These are indications that the heap was not properly constructed. Humus made in this manner is absolutely safe for use in the vegetable garden.

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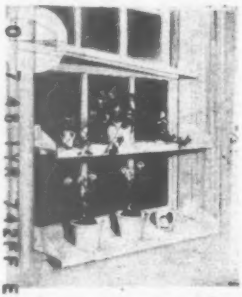

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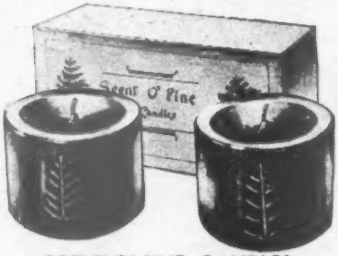

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